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DEPARTMENT OF CITY PLANNING

100 LARKIN STREET · SAN FRANCISCO, CALIFORNIA 94102

SAN FRANCISCO CITY PLANNING COMMISSION

DRAFT ENVIRONMENTAL IMPACT REPORT

VOLUME 2 OF 2

(APPENDICES)

HOME OFFICE BUILDING

for

STATE COMPENSATION INSURANCE FUND

EE 74.71

15 November 1974

SAN FRANCISCO CITY PLANNING COMMISSION

DRAFT ENVIRONMENTAL IMPACT REPORT

HOME OFFICE BUILDING
for
STATE COMPENSATION INSURANCE FUND

At Market and Ninth Streets
in the block bounded by Market,
Ninth, Mission and Eighth Streets

EE 74.71

15 November 1974

VOLUME 2 OF 2

(APPENDICES)

Home office building for
State Compensation
1974-

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* Environmental Impact Report consists of two volumes: Volume 1, the Report itself, and Volume 2, the Appendices enumerated here.

APPENDIX A

EE 74.71

PRELIMINARY SOIL AND FOUNDATION INVESTIGATION

LEE AND PRASZKER
Soil Engineers
147 Natoma Street
San Francisco, California 94105

May 31, 1974
(Revised September 1974)

PRELIMINARY

SOIL AND FOUNDATION INVESTIGATION

CALIFORNIA STATE COMPENSATION FUND BUILDING

9TH AND MARKET STREETS

SAN FRANCISCO, CALIFORNIA

1. INTRODUCTION AND SCOPE

This preliminary report presents the results of a soil and foundation study for use in conceptual planning and preliminary foundation design. Further, the items of the investigation relating to site-geology and groundwater include statements of environmental impact, apart from their engineering treatment. The environmentally related items are presented in such a manner as to allow their integration directly into an overall environmental impact report, which will be produced by others.

The investigation included the sinking of 12 test borings to an aggregate depth of 1327 feet through man-placed fill and natural soils. Observation of groundwater and geological reconnaissance were made with due consideration to environmental factors.

Except for portions relating to environmental impact, the report is of a preliminary nature. A final report will be issued upon completion of soil testing and analysis relating to specific foundation design parameters.

NOTE: For definitions of technical words, see glossary at end of this Appendix.

2. SITE DESCRIPTION

The project site is located on upper Market Street, southeast of the Civic Center, San Francisco, California. It is essentially rectangular in shape and bounded by the southeast corner of Market and 9th Streets, having respective frontages of 275 feet and 200 feet. On the east, the site adjoins a 7 story steel frame building with brick facing and on the south it is bounded, to the east of Laskie Street, by a 3 story building and, to the west of Laskie Street, by an existing parking lot.

The area is level, having been created by demolition of an old 3 story building with a single basement. It now serves as an asphalted parking lot. Curb elevation at Market and 9th Streets is approximately +47 feet SFCD (San Francisco City Datum).

The site is not landscaped and is, therefore, unimpressive at this time. The general area of the site has found new potential with the completion of BART which will provide service to the site from a station less than 1/2 block away. The proposed structure and the associated plaza and landscaping, together with the nearby BART, Fox Plaza and the Civic Center, will greatly increase the utility and enhance the esthetics of the general area of the site.

3. PROPOSED STRUCTURES

The proposed structure is to be a high rise office building of maxi-

mum plan dimension 240 feet x 150 feet at the base. The plan dimension then diminishes upward so that the top dimension at the 17 story level is approximately 120 feet x 120 feet. The stepped-in facade of the building faces east toward Mission and 8th Streets. The structure is to be of steel frame with precast concrete wall panels.

The building will have a maximum of 3 basements, requiring excavations of up to 40 feet below curb elevation.

Column spacing is approximately 30 feet, and column loads will vary to a maximum of 800 tons (dead load plus adjusted live load).**

The location of the proposed structure with respect to the lot and existing streets is shown on Plot Plan, Diagram 1.*

4. SITE INVESTIGATION

Twelve test borings were made at the site at locations shown on the Plot Plan, Diagram 1.* The borings were so located as to afford meaningful soil profiles across the building site and at foundation levels.

The deepest boring extended to a depth of 246 feet and penetrated into the underlying rock, as did 2 other borings. The remainder of the borings penetrated to a maximum depth of 71.5 feet. The aggregate depth drilled was 1327 feet.

* Plot Plan, Diagram 1, is available at Department of City Planning, see third paragraph, next page.

**See attached glossary

Test boring operations were performed between February 11 and February 28, 1974 by the J. N. Pitcher Company of Daly City, using a Failing 1500 truck mounted rotary rig with a 6 inch fish tail bit. Borings had to be cased to a depth of at least 20 feet to prevent caving. A total of 146 undisturbed samples were taken from the test borings and transported to the laboratory for testing. Piezometers* were installed in test borings following completion of drilling, and water level readings were made on several occasions.

Drilling and sampling were performed under the direction of a qualified geologist from this office who logged and classified the soils in the field.

Test boring logs, prepared from field observation and some laboratory test results have been placed on file with the Department of City Planning and are available for inspection upon request.

A numerical summary of test borings with some pertinent data follows:

*See attached glossary

FIELD EXPLORATORY DATA

BORING NUMBER	GROUND SURFACE ELEV. *	BOTTOM OF BORING ELEV. *	DEPTH DRILLED (FT.)	HIGHEST GROUND-WATER ELEV. **	NUMBER OF SAMPLES*** 3.25" O. D. SPLIT SPOON SAMPLER	3.0" O. D. SHELBY TUBE SAMPLER
1	+48.3	-197.7	246	+21.8	27	0
2	+45.5	-193.0	238	+20.0	14	1
3	+44.2	-27.3	71.5	+19.2	11	0
4	+46.2	-25.3	71.5	+19.7	11	0
5	+46.3	-185.7	232	-	10	1
6	+45.7	-25.3	71	-	11	0
7	+47.2	-24.3	71.5	-	10	0
8	+45.7	-25.3	71	-	11	0
9	+45.7	-25.3	71	-	11	0
10	+46.1	-24.9	71	-	10	0
11	+47.6	-23.9	71.5	-	11	0
12	+47.2	+6.2	41	-	7	0
TOTALS			1327.0		144	2

* Elevation in feet, San Francisco City Datum (+ means above, - means below).

** Measured 3/19/74, Elevation in feet, SFCD (- means no reading)

*** The split spoon sampler was driven with a down-the-hole hammer weighing 345 pounds and dropped 30 inches with a mechanical winch; the Shelby tube sampler was pushed hydraulically on the end of a drilling rod.

5. GEOLOGY

The site is located over a deep, buried Franciscan* rock canyon at the geologic confluence of Hayes Valley and Yerba Buena creeks.[1] This canyon was eroded into the Franciscan bedrock during the Pliestocene Epoch* when sea level was lowered to at least 300 feet below its present elevation. The canyon was progressively filled with alternating marine alluvial and windblown deposits as the sea slowly rose to its present level. The marine deposits are bluish-gray in color and consist of fine sediments such as clay, silt and some fine sand. The fresh water and windblown deposits generally ranging from yellow-brown to tan in color, tend to consist of medium to fine sands with or without varying amounts of clay, silt, gravel, and rock fragments. Dark gray marine clay was deposited when the sea reached and maintained its present level. Deposits above mean sea level are generally windblown sands.[2]

The bedrock, weathered and fractured, consists of interbedded feldspathic sandstone and shale and lies approximately 230 feet below the surface of the project site. The rock slopes approximately 4 degrees to the south.

Slope debris, derived from decomposed rock and windblown sediments, was transported down slope by torrential rain runoff and was deposited on the bedrock to a maximum thickness of 15 feet. Covering the slope debris is a layer of blue-gray, slightly sandy clay (Lower Bay Mud) which is an indication of marine deposition at the early stages of canyon filling. Subsequent stream and windblown deposition created a thick sequence of fine sand with minor layers of silty sands a-

*See attached glossary

bove the marine clay. Thin lenses of dark gray sandy clay were deposited in the low areas of the hummocky topography (sand dunes) created by the wind blown sand, which brought the site up to its present elevation of approximately 50 feet SFCD. Occasionally, deposition of the sands were interrupted, allowing the creation of stagnant ponds which supported sparse vegetation and, when buried, formed very thin layers of very stiff, sandy, peat-like material.

The San Andreas fault system lies approximately 7 miles southwest of the site and the Hayward fault system lies approximately 12 miles to the northwest. No active shear zones are known to occur in the vicinity of the project site. However, it must be assumed that, due to the high degree of seismic activity in the Bay area, the project site will be subjected to major shaking during its economic life. The characteristic natural period of the underlying soil should range from approximately 1.0 to 1.5 sec due to the propagation of shear waves through 200 feet of loose to dense sand.[3]

The seismic response and stability conditions of the site will be affected to a minimum by the presence of the proposed structures since weight of the proposed structures is nearly equal to the soil which will be excavated.

According to the present day state of the art and technology, liquifaction potential at or below foundation horizons is remote or totally nonexistant.

The excavation will compensate for the weight of the building, therefore, there will be no alterations in the present long term stability either on the site or the surrounding local area. There will be no

change in the erosion potential or the surface permeability.

1. Outline Map of San Francisco showing Franciscan Drainage, Lee & Praszker, 1959
2. Geology of the San Francisco North Quadrangle, USGS, 1958.
3. Recommendation by a subcommittee of the SEAONC Seismology Committee, 1973

6. LABORATORY TEST RESULTS

A total of 140 unit weight and 141 water content determinations were made on representative samples of the soils encountered in the borings. Four Direct Shear tests and 2 consolidation tests were performed on typical samples of soils to be affected by foundation loads. The results of laboratory tests are available in the files of the San Francisco Department of City Planning.

7. SOILS AND SOIL PROFILES

Soil sections and a plot plan showing their locations and those of the test borings accompany and have been prepared from test boring and laboratory test results filed with the Department of City Planning and are available for inspection upon request.

These sections, being oriented parallel to Market Street, also show the horizontal and vertical location of adjacent (east property line) building foundations but neither the horizontal nor the vertical locations of the adjacent building footings have been verified. It is re-

commended that this be done prior to commencement of excavations.

A study of these soil sections reveals that:

1) The site is directly underlain by man-made fill of erratic thickness varying from 9 feet at Test Boring No. 4 to 20 feet at Test Boring No. 12. The fill is loose, containing bricks and concrete fragments which were used in backfilling old basements.

2) Underlying the fill is a sandy soil varying from wind blown, loose sand to a depth of approximately 30 feet below curb elevation, to dense, fairly cemented sand and silty sand below. Underlying this sand at depths of 200 feet is a 20 foot layer of stiff Lower Bay Mud which rests on a 10 foot layer of dense alluvium directly overlying bedrock. The dense sand includes occasional and erratic silt and clay lenses, some even containing a peaty substance. However, the thicknesses of these lenses do not appear to exceed 2 to 3 feet with peat layers up to 4 inches. The consistency of these fine grained lenses, except for the peat, is medium to dense, but not soft, the lenses having consolidated under the existing overburden.

3) Bedrock underlies the site at depths varying from 230 feet to 246 feet below curb elevation.

   The rock consists of Franciscan sandstone and shale and is generally covered with a layer of gravelly clay and silt, stiff and fairly incompressible under existing overburden pressures.

4) Groundwater appears to be approximately at elevation +20 feet which is 26 feet below curb elevation. This groundwater probably emanates from absorption at higher elevations both from Hayes Valley and the Twin Peaks area. Its source is fresh water and it is not influenced by tidal fluctuations.

The proposed project will have little or no effect on the groundwater regime within the site or the general vicinity. There is little probability of contamination of the local groundwater, except as may be caused by a utility line break.

It is unlikely that landscaping of the site and resultant irrigation will have any effect on the groundwater regime.

Alteration of the groundwater flow will be slight since the proposed building will only extend 5 feet below the present groundwater level. Since the upper aquifer extends to a depth of approximately 50 feet below the proposed building, the effect of interference with groundwater flow will be minimal.

It will be necessary to temporarily lower groundwater level in the area for construction purposes. However, no long term detrimental effects are anticipated. The short term effect will be minimal and perhaps negligible due to the high density of sand in which dewatering is to be accomplished. It is, however, recommended that observation points be placed at strategic locations outside the excavation boundary and such points be monitered during construction. Should adverse conditions develop, a recharge system would become necessary.

[illegible]

5) Because the soils at the foundation level are well below the water table, they are likely to be moist and naturally resistant to airborne transportation. Accordingly, construction phase air pollution due to blowing dust will be nominal.

Respectfully submitted,

LEE AND PRASZKER

Arthur T. Knutson

Arthur T. Knutson
May 31, 1974

TECHNICAL WORD DEFINITIONS

1. alluvium - stream deposits of comparatively recent times.
2. aquifer - a formation, group of formations, or part of a formation that is water bearing.
3. bedrock - any solid rock underlying soil, sand, clay, etc.
4. Consolidation Test - test undertaken to determine soil compressibility characteristics.
5. Dead Load - loads on a foundation due to the weight of the supported structure.

   Live Load - loads on a foundation due to occupancy of the structure, wind forces on the structure, and earthquake forces on the structure.
6. Direct Shear Test - test undertaken to determine the strength of a soil.
7. erosion - wearing away, disintegration.
8. fault - a break in rock strata or veins that causes a section to become dislocated along the line of fracture.
9. fault system - consists of two or more fault sets that were formed at the same time.
10. feldspar - any of several minerals made up mainly of aluminum silicates, usually glassy and moderately hard, found in nearly all crystalline rocks.
11. Franciscan - local formation name; mostly sheared sandstone and shale.
12. geology - the science dealing with the structure of the earth's crust and the formation and development of its various layers: it includes the study of individual rock types.

13. groundwater - water found underground in porous rock strata and soils, as in a spring.

14. hummock - a low, rounded hill; knoll; hillock; a tract of wooded land above a marsh or swamp.

15. Marine alluvium - banks of shingle (sand and gravel) thrown up by a wave of the sea upon the land.

16. Mean sea level - the average height of the sea for all stages of the tide.

17. period - the interval of time necessary for a regularly recurring motion to make a complete cycle and start again.

18. permeable - having a texture that permits water to move through it.

19. Pliestocene Epoch - geologic epoch of 2 to 3 million years past.

20. piezometer - any of various instruments used in measuring pressure, compressibility

21. sediments - material in suspension in water or recently deposited from the waters of streams, lakes or seas.

22. seismic - pertaining to, characteristic of, or produced by earthquakes or earth vibration.

23. shear zone - a zone in the earth in which rock has been crushed on a large scale by the cumulation of small lateral movements along innumerable parallel planes, resulting from pressure.

24. test boring - a hole sunk for the purpose of obtaining information about the sub-surface.

25. Unit Weight and Water Content Tests - tests undertaken to determine soil weight per unit volume. Test results are an aid in soil classification.

APPENDIX B

EE 74.71

TRANSPORTATION IMPACT REPORT

DE LEUW, CATHER AND COMPANY
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San Francisco, California 94105

May 1974
(Revised September 1974)

STATE COMPENSATION INSURANCE FUND BUILDING

TRANSPORTATION IMPACT REPORT

CONTENTS

I. PROJECT DESCRIPTION

The State Compensation Insurance Fund is an Agency of the State of California, charged with administering the program of the same name. The present Home Office of the Agency, at 525 Golden Gate Avenue, is no longer adequate for the growing activity of the Agency. Faced with a need to relocate, the Agency is planning to build a new Home Office Building at a site with more convenient transit access, and space for garaging the vehicle fleet used by the Agency.

The new Home Office for the State Compensation Insurance Fund would consist of a 17 story office building, a street level plaza and three basement levels of storage and parking to be built on the east side of Ninth Street at Market Street.

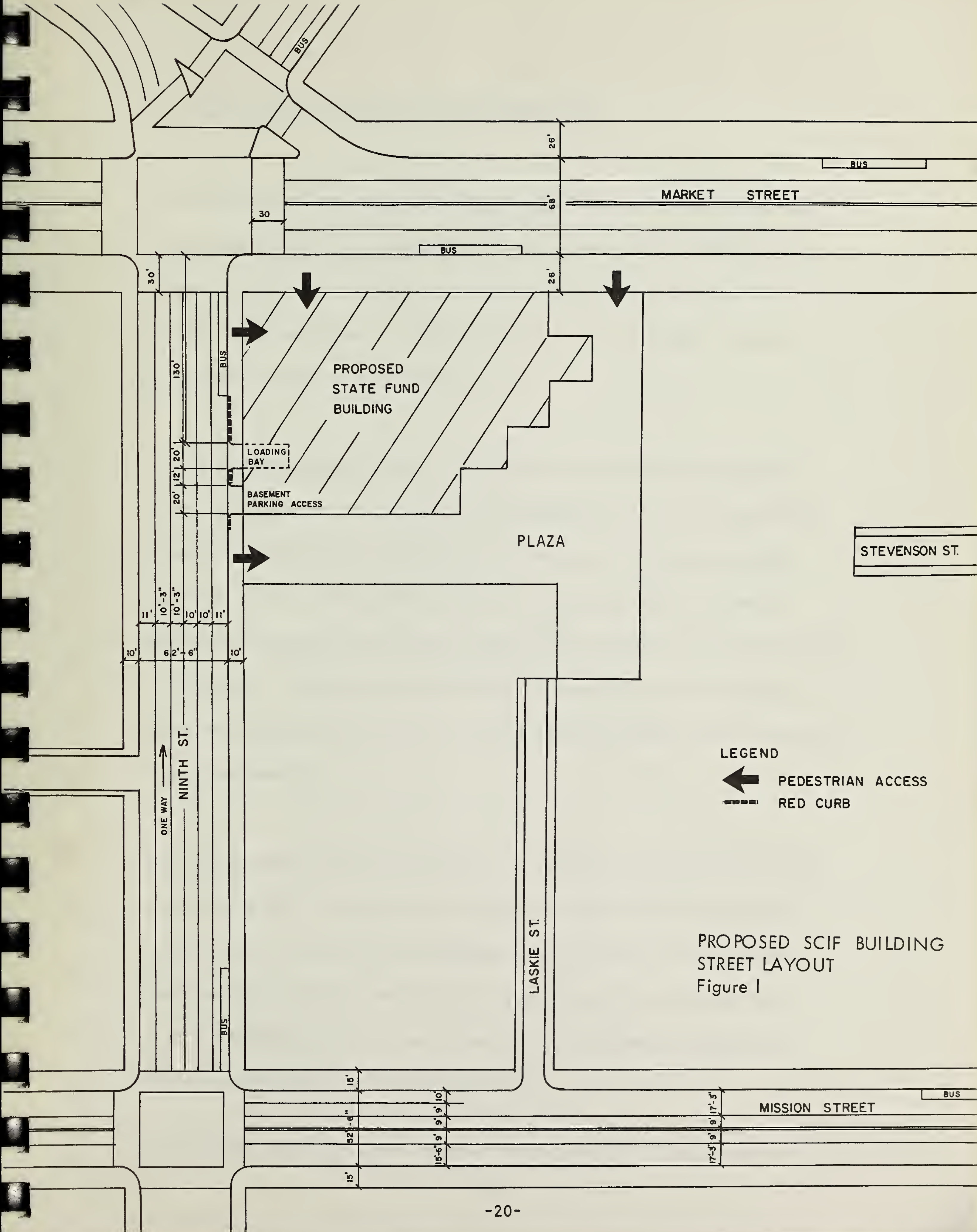
The SCIF building is planned to contain office space for 1500 employees, occupying some 350,000 square feet of floor space. This latter figure includes a cafeteria, conference rooms, training facilities and a council room, which accounts for the somewhat high figure of 230 square feet per employee.

Initially SCIF expects to employ some 640 people in the building, occupying about half of the floor space. The remaining space would be rented, probably to other government agencies. Eventually SCIF expects to occupy the entire building, probably by 1996. The building would include a cafeteria occupying some 7,500 square feet to meet the needs of employees in the building, but available also to the public.

At the plaza level, some 10,000 square feet of retail space are planned, which, it is anticipated, would also depend substantially on local employees for business.

It is planned to provide parking for 175 cars on three levels in the basement of the structure. Project parking is discussed more fully in Section 4. Entrance and exit for the basement garage would be on Ninth Street approximately 165 feet south of Market Street. An off-street loading bay, with capacity for two trucks, would be located adjacent to the garage ramp approximately 140 feet south of Market Street. Figure 1 indicates how the building relates to the street, including location and dimensions of traffic features.

In order to avoid the uncertainties inherent in any long term projections, particularly in the transportation field, all estimates and calculations in this report are based on conditions anticipated at the time the building is completed in 1976. Where any significant changes may be expected as a result of SCIF's expansion, these are outlined at the appropriate point in the text.



PROPOSED SCIF BUILDING
STREET LAYOUT
Figure I

2. PROJECT TRIP GENERATING CHARACTERISTICS

To determine what changes in the existing transportation pattern the project might be expected to cause, it is necessary to develop a profile of the building's main tenants' travel habits. Fortunately the owner and principal occupant of the project already has offices in a nearby location, and it was possible to carry out a survey to obtain this data directly.

In a survey administered by SCIF, a questionnaire was sent to every fifth name on the SCIF employee list, asking how they travelled to work, where they lived, where they parked (if auto commuters), and how many non-commute trips they made, per week, out of the office, a) by auto, and b) by transit. Where no response was obtained, the employee's supervisor was requested to complete the form on his behalf. If the supervisor did not know the travel habits of that employee, he was then asked to give the form to the next employee alphabetically in the same employment category.

Table I represents a summary of this survey. It should be noted that the auto trips generation by SCIF, at 0.71 daily auto trips/ employee, is somewhat above the figure of some 0.4 daily auto trips/employee, more typical for a downtown San Francisco office building*, reflecting the large number of non-commute trips made by field staff, and, to a lesser extent, the inconvenience of the present site for personal business and shopping activities.

*Derived from the San Francisco Downtown Parking and Traffic Study, 1965 (DPATS)

TABLE I

SUMMARY OF SCIF EMPLOYEE SURVEY, FEBRUARY, 1974

Commute Mode	Auto Driver	Auto Passenger	Transit	Walk	Bike	TOTAL
Expanded Total *	126	88	297	33	6	550
Percentage	23%	16%	54%	6%	1%	100%

Area of Residence	San Francisco	East Bay	Marin	Peninsula	TOTAL
Expanded Total*	330	66	55	99	550
Percentage	60%	12%	10%	18%	100%

No. of Non-Commute Trips Per Day	Auto	Transit
	138	92

Total Employee Population	550
Total Daily Trips	1330
Daily Auto Trips	390
Auto Occupancy for work trips	1.7

NOTES:

Population Sample -- 115
Questionnaires Returned -- 111
*Survey Results expanded to current SCIF employee population of 550.
Auto Passengers predominantly travel in some formal or informal carpool It is assumed that no additional auto trips are generated by auto passengers.
Five percent of the population commute one way by transit, one way as auto passengers. These are assigned equally as transit riders or auto passengers.

The non-SCIF employees, for whom no specific characteristics can be developed, must be assumed to have travel habits similar to other San Franciscan office workers, modified as appropriate in the light of the SCIF survey. This includes a slightly higher level of trip making activity than SCIF employees (2.7 instead of 2.4). The full traffic generating potential of the project is set out in Table 2.

Part of the traffic impact of the project is the effect of displacing the present land use. The project site is currently used as an open parking lot. From an inspection of the site, and information supplied by the operator, some 192 parking spaces would be eliminated by the project. The southeastern part of the existing parking lot, comprising a further 94 spaces, would remain in its present use. The present lot attracts some 480 parking movements per day, 180 of them being peak hour commuters. The removal of 192 of the parking spaces, as required for the construction of the SCIF building, would also eliminate the trips generated by those spaces.

Table 3 sets out the estimated traffic impact of displacing part of the existing parking lot, based on a linear relationship between spaces and trip generation. In practice Table 3 can only serve as an indicator because changes in demand and parking rates may be expected to modify user behavior.

TABLE 2
STATE COMPENSATION INSURANCE FUND BUILDING -- TRIP GENERATION, 1976

Generator	Trip Generating Unit	Adjusted Population	Auto Generation Factor	Daily Auto Trips	Peak Hour AM	Peak Hour PM	Daily Transit Trips	Peak Hour AM	Peak Hour PM
SCIF Employees (640) Commute Trips only	Persons	576	.46	264	132	132	622	311	311
SCIF Employees (640) Non Commute Trips	Company Autos	136	1.64	223	28	28	96	-	-
Tenants and Retail Employees (880) all trips	Persons	748	.55	411	130	130	1212	450	500
Retail Stores - non employees	1000 sq. ft.	10	10	100	-	20	50	-	10
Service Vehicles	1000 sq. ft.	350	.3	105 (commercial)	10	-	-	-	-
TOTAL				1103	300	310	1980	761	821

Notes on Trip Generating Characteristics

Generator		Source
SCIF Employees		
	2.4 trips/employee/day	SCIF Employee Survey
	10 percent absence rate	SCIF
	Commute pattern continues as surveyed (Table 1)	
	Non commute auto trips, 1.64 trips per auto in fleet per day	SCIF Employee Survey
	Non commute transit trips, .167 trips per employee per day	SCIF Employee Survey
Tenants and Retail Employees		
	2.7 trips/employee/day	De Leuw, Cather & Company
	10 percent absence rate	De Leuw, Cather & Company
	5 percent vacancy rate	De Leuw, Cather & Company
	60 percent transit ridership	De Leuw, Cather & Company
	.55 auto trips/day/employee being the mean of .71 derived from	SCIF Employee Survey
	and .40 derived from	S.F.D.P.A.T.S.
	Auto occupancy 1.5 (Compared to 1.7 in SCIF Employee Survey for commute trips, and 1.3 in Planning Dept. Guidelines for EIRS)	
Retail Stores		
	Heavily dependent on adjacent offices for business. It is not anticipated that these stores (or the cafeteria) will generate appreciable patron auto traffic.	
Service Vehicles		
	30 commercial trips/day per 100,000 sq. feet	S.F.D.P.A.T.S.
	Approximately 5 percent heavy trucks	

TABLE 3

PARKING DISPLACEMENT IMPACT

	Existing Lot	Displaced Part of Lot
Capacity (spaces)	286	192
Average Daily Vehicle Trips generated	960	644
Peak Hour Trips generated (vehicles per hour)	180	121

3. TRAFFIC IMPACT

To effectively evaluate the traffic impact of this project, the three principal contributing elements must be examined. These are:

a. Traffic generated by the project assigned to the streets giving access to the project.

b. Traffic generated by the project but not assigned to the streets adjacent to the project.

c. Traffic generated by the present use of the site which will be displaced.

The first category includes all traffic generated by the project, as set out in Table 2, except for that part of the commute traffic for which no parking is available at the site. Since SCIF intend to occupy 130 parking spaces with company cars which may not be used for commuting, and the tenants would have only 45 spaces for all purposes, it is anticipated that only 25 percent of commute trips could actually originate at the site. However it is estimated that a further 25 percent will pass the site going to or from off site parking, based on the SCIF survey of trip origin. All service and non-commute trips may be expected to originate in the immediate vicinity of the project.

The second category includes 75 percent of the commute trips. Many SCIF employees use the State owned parking lots, and most of them may be expected to continue to do so. Others use the Civic Center garage, which is almost as near to the project

as it is to the present SCIF offices, while the remainder may be expected to use various private lots generally south of Market Street.

The third category covers those trips now being made from the site which would be displaced, as summarized in Table 3.

The total effect of these changes is set out in Table 4. It will be noted that the trend is for a very marginal increase in the traffic carried on the adjacent streets, with a minor reduction in the peak hour traffic levels.

It should be noted that two other trends can be predicted, but not at this time readily quantified. The increased parking deficiency may lead to a minor increase in traffic seeking for a place to park. The completion of BART and the Muni Metro will accelerate the recent trend towards increased transit ridership, leading to a minor reduction in traffic. The net effect of these opposite trends will be very slight, and may render the overall traffic projections for the project somewhat conservative.

TABLE 4

STATE COMPENSATION INSURANCE FUND BUILDING

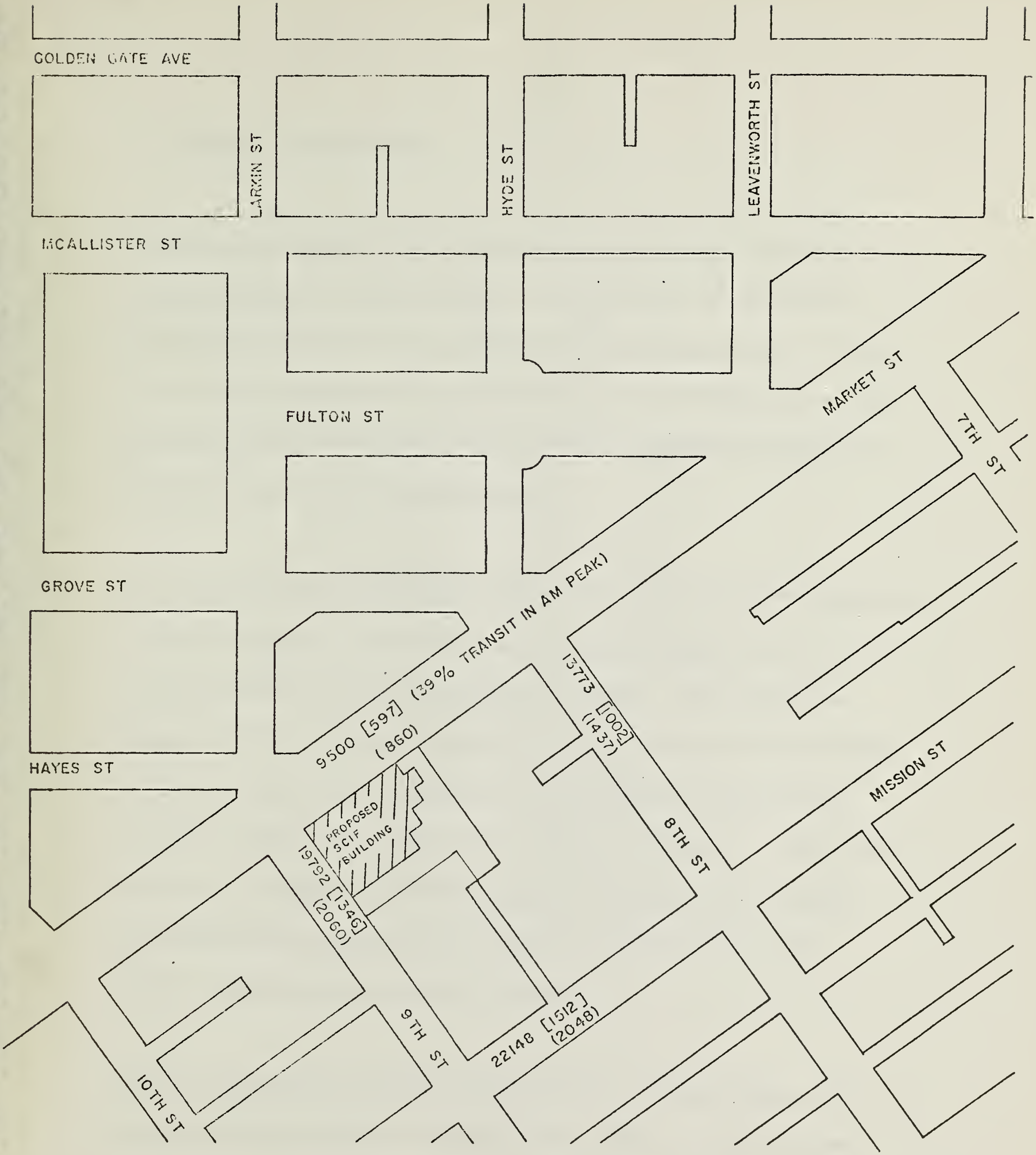
Traffic Impact on Adjacent Streets (1976)

Street	Width	No. of Lanes	24 Hour Traffic (ADT) Existing	Added	%	AM Peak Hour Existing	Added	%	PM Peak Hour Existing	Added	%
Market (Ninth to Eighth)	68'	4	9,500	85	0.9	597	0	0	739	10	-1.4
Eighth (Market to Mission)	62'-6"	4	13,773	96	0.7	1,002	-25	-2.5	1,437	-13	-0.9
Ninth (at Market)	62'-6"	4*	19,792	96	0.5	1,346	-18	-1.3	2,059	-26	-1.3

*Ninth Street is increased to 6 lanes by removal of parking in the p.m. peak hour.

Source: SF DPW, Traffic Engineering

De Leuw, Cather & Company



LEGEND

444 ADT

[37] AM PEAK HR.

(35) PM PEAK HR.

PROPOSED SCIF BUILDING
1974 TRAFFIC COUNTS
Figure 2

4. INFLUENCE ON PARKING

The project would eliminate 192 public parking spaces, some two-thirds of the existing parking lot at Ninth and Market. It would contain 175 new parking spaces in three basement levels, available for SCIF vehicles and tenants. Since this is in excess of the 75 parking spaces permitted in a new office building of this size under the City Planning Code, application for a Conditional Use Permit has been filed with the City Planning Commission.

It is a feature of SCIF operations that a fleet of cars is required for field operations. Under State regulations, these State owned cars must be garaged at the work site overnight, and may not be used for employee commuting. At the present time (February, 1974) the SCIF fleet numbers 84 vehicles, and uses Civic Center Garage. By 1976, fleet replacements, expansion, and the relocation of outlying offices in the new building will bring this number to 130 cars. Eventually a maximum fleet of 150 cars is envisaged. The remaining spaces (45 in 1976) would be allocated to the tenants who would occupy some 50 percent of the floor space, and to visitors. No public parking would be available.

The area is one presently showing a marginal deficit in off-street parking. The completion of the new Western Merchandise Mart Addition (369,000 square feet and the SCIF building (350,000 square feet) will substantially increase this deficit.

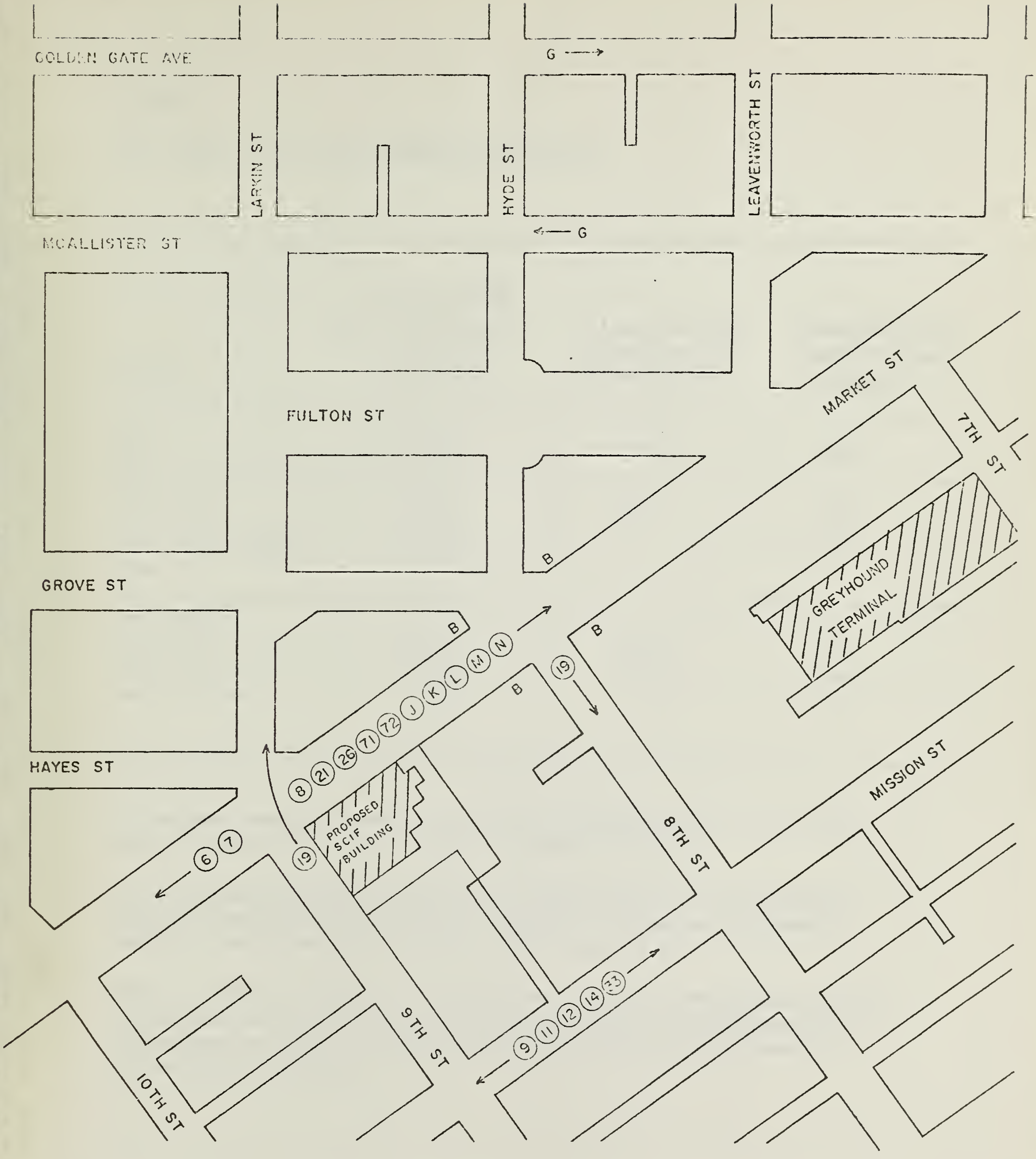
It is anticipated that parking rates will rise to reflect this demand, and that a simultaneous minor mode shift in favor of transit will occur. It is also probable that some of the parking displaced from Ninth and Market Streets will use the spaces vacated by SCIF at the Civic Center Garage.

5. IMPACT ON TRANSIT SYSTEM

The project site is exceptionally well served by transit. By the time the project is completed late in 1976, it is anticipated that BART will be completed, and the Muni subway in operation. The Civic Center Station on these systems has an entrance on the same block as the project. In addition the Muni 6, 7, 8, 21, 26, 66, 71 and 72 lines run on Market Street, the 9, 11, 12, 14 and 33 (eastbound only) run on Mission Street, along with the privately operated jitney service. The 19 line on Eighth and Ninth Streets provides crosstown service to the SP station and Fishermans Wharf. Golden Gate Transit's Civic Center route uses Golden Gate Street and McAllister Street offers service to Marin County, while from the Greyhound terminal at Seventh and Market, commute service is offered to the peninsula.

Figure 3 outlines the transit facilities adjacent to the Project site. The project would generate some 2000 transit trips daily, with up to 820 in the critical p.m. peak hour. Based on the "location of residence" date derived from the SCIF employee survey, the peak hour transit trips can be assigned to the principal facilities, as set out in Table 5.

All four streets bounding the project block are classed as transit preferential streets. However the estimated reduction in auto traffic generated by the project during the critical peak hours would tend to improve traffic conditions on these streets.



LEGEND

(3) MUNI LINE

B BART

G GOLDEN GATE TRANSIT

Note

J K L M N Streetcar lines will operate in subway in 1976. Access as for BART.
6 7 21 Trolley bus lines may be rerouted on Mission Street.

PROPOSED SCIF BUILDING
TRANSIT AVAILIBILITY
Figure 3

TABLE 5.

SCIF IMPACT ON TRANSIT SERVICE (P.M. PEAK)

Facility	Estimated 1976 Peak Hour Capacity (One-way) passengers/hr.	Present Peak Hour Load (One-way) Passengers/ hr.	Added Peak Hour Load (One-way) Passengers/hr
BART	25,000	5,300	180
Muni Metro	12,000	11,500	180
Muni Market Street Lines	9,000		90
Muni Mission Street Lines	7,500	5,000	75
Muni #19 Line	1,100	700	20

1) The added peak hour load is calculated for the peak direction, and is not the same as the total of all peak hour transit trips shown in Table 2.

2) BART Estimated Capacity based on seats x load factor of 2. Muni Capacity based on Muni figures for "crush load", adjusted to 1976 headways proposed in the BART - Muni Coordination Study by Deleuw Cather & Co.

3) Approximately one third of the "Added Transit Trips", are being made by SCIF employees at present, from the existing office, but should not be deducted because no consideration is given to the future trips generated by the future tenants of the existing SCIF building.

Data Source BART and Muni.

6. PEDESTRIAN AND BICYCLE FACILITIES

Substantial sidewalk space will be available for pedestrian movements on both Market and Ninth Streets. The Market Street sidewalk is currently being widened to 26 feet. Principal pedestrian movements generated by the project would be along the south sidewalk of Market Street to the BART station at Eighth Street, and across the crosswalks at Ninth and Market. Each crosswalk is of adequate width, and includes a pedestrian "walk" phase. As part of the project, a pedestrian plaza is proposed behind the SCIF building which would also permit pedestrian flow between Ninth Street and Market Street. The location of this plaza and the dimensions of pedestrian facilities is shown in Figure I.

From a survey of SCIF travel habits, there appears to be little demand for bicycle parking facilities at present. Future programs to encourage bike cummuting, in accordance with national trends, may stimulate additional bike traffic. Such programs might include improvements to the existing bike route between the Panhandle and Civic Center, and the construction of bike lanes on Outer Market Street. It is not planned to provide bike parking in the project, but no problem is anticipated in providing such facilities either in the pedestrian area at street level or in the basement parking area should demand increase. Bike parking demands little space. Up to 20 bicycles can be parked in the space required to park one car.

7. CUMULATIVE IMPACT OF COMMITTED PROJECTS

The only other committed project within the zone of influence of the SCIF building is the Western Merchandise Mart Addition, just off Ninth Street, opposite the SCIF site. No Environmental Impact Report was required for this project, which is now under construction, and so no quantitative estimates can be developed. However it can be seen from the preceding analysis of the SCIF building that

1. The SCIF project would marginally reduce traffic at the critical peak periods.

2. That the two projects would increase the local parking deficit.

3. That there would be an increase in the demand for transit service at a location where the transit system is potentially able to absorb it, involving at most some extra runs on existing routes.

8. CHANGES IN NOISE LEVELS

To develop estimates of the changes in noise levels caused by the project, it is first necessary to establish the existing noise contour pattern. Noise readings were taken on the site during the morning peak hours to measure the existing noise levels. A Simpson Model 885 Sound Level Meter was used to record noise intensity in A-weighted decibels (dBA)*. Peak hour (7-9AM) and midday noise level readings were taken at 10 second intervals and classified to obtain two indicators of noise acceptability:

- <u>Average Intensity</u> (L_{50} or that noise level exceeded 50 percent of the time) most applicable to locations along freeways or busy streets where noise is continuous. In general, the higher the volumes on the street and the further away from the roadway, the steadier the noise level becomes, since the significance of individual vehicles is masked by the line of traffic. Conversely, average noise level loses its sufficiency as a sole indicator of how bad the noise is as one gets close to the roadway or traffic volumes drop to the point where the overriding impression is the "whoosh" of passing vehicles rather than a continuous drone.

- <u>Peak Level Noise</u> (L_{10} or that noise level exceeded 10 percent of the time) most applicable to locations where passing cars, trucks, etc. are perceived individually as opposed to a steady traffic noise. Measures of such variation are particularly applicable within 50-100 feet of a roadway, where traffic volumes are less than 20,000 vehicles per day or trucks and buses compose more than one percent of passing vehicles. Highway Research Board procedures show preference for use of L_{10} levels when variation between L_{50} and L_{10} exceeds 6dBA (this is the condition at the proposed office site).

a. <u>Current Noise Levels</u>

Portions of the site currently experiencing the greatest traffic noise (L_{10} in AM peak of 75 dBA; see Figure 4) are adjacent Ninth Street and the San Franciscan Hotel building. Ninth Street has a much higher volume of traffic than Market Street, and some 25 percent of all traffic on Market Street is electrically propelled, resulting in a 4-5 dBA lower noise level reading along Market than along Ninth. Sound waves

* The A-weighted decibel scale is a sound measurement scale incorporating a perception bias similar to that of the human ear. It is therefore the scale commonly used when measuring sound levels in an environmental context.

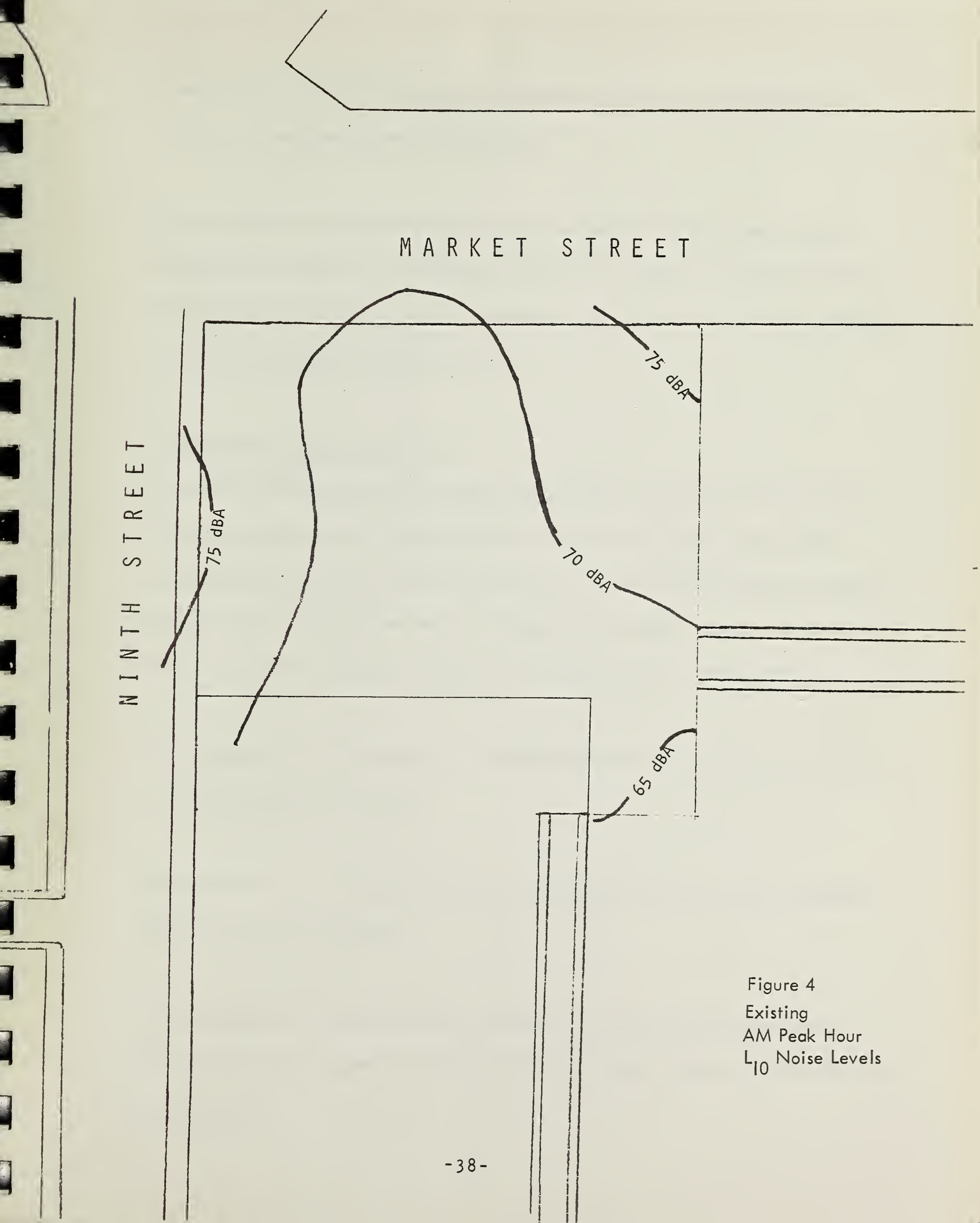


Figure 4
Existing
AM Peak Hour
L_{10} Noise Levels

reflected off the side wall of the San Franciscan Hotel cause up to 5 dBA increase in noise level immediately adjacent the building.

Current noise levels on the site reach but do not exceed the 75 dBA Federal Highway Administration standard of acceptability for exterior noise adjacent to office buildings.* The City Noise Ordinance adopted in September, 1972 contains no regulation pertaining to maximum acceptable transportation noise.

b. <u>Noise After Project Completion</u>

Completion of the proposed office building and placement of building walls adjacent to the street can be expected to increase sidewalk noise levels 3-5 dBA, due to sound waves reflected from adjacent buildings (Figure 5). The use of sound-absorbent material (irregular facade, textured masonry) could prevent this increase. However, hard, reflective surfaces will cause sound waves to reverberate and noise levels to rise.

The structure itself may be expected to shield the plaza area from street noise, reducing noise levels there by up to 5 dBA.

No traffic increase, and hence, no traffic-generated noise increase would be expected with office building completion.

It is anticipated that second floor offices facing onto the street would be exposed to a maximum interior L_{10} peak hour noise level of 50 dBA due to traffic outside the building.

* See Page 43.

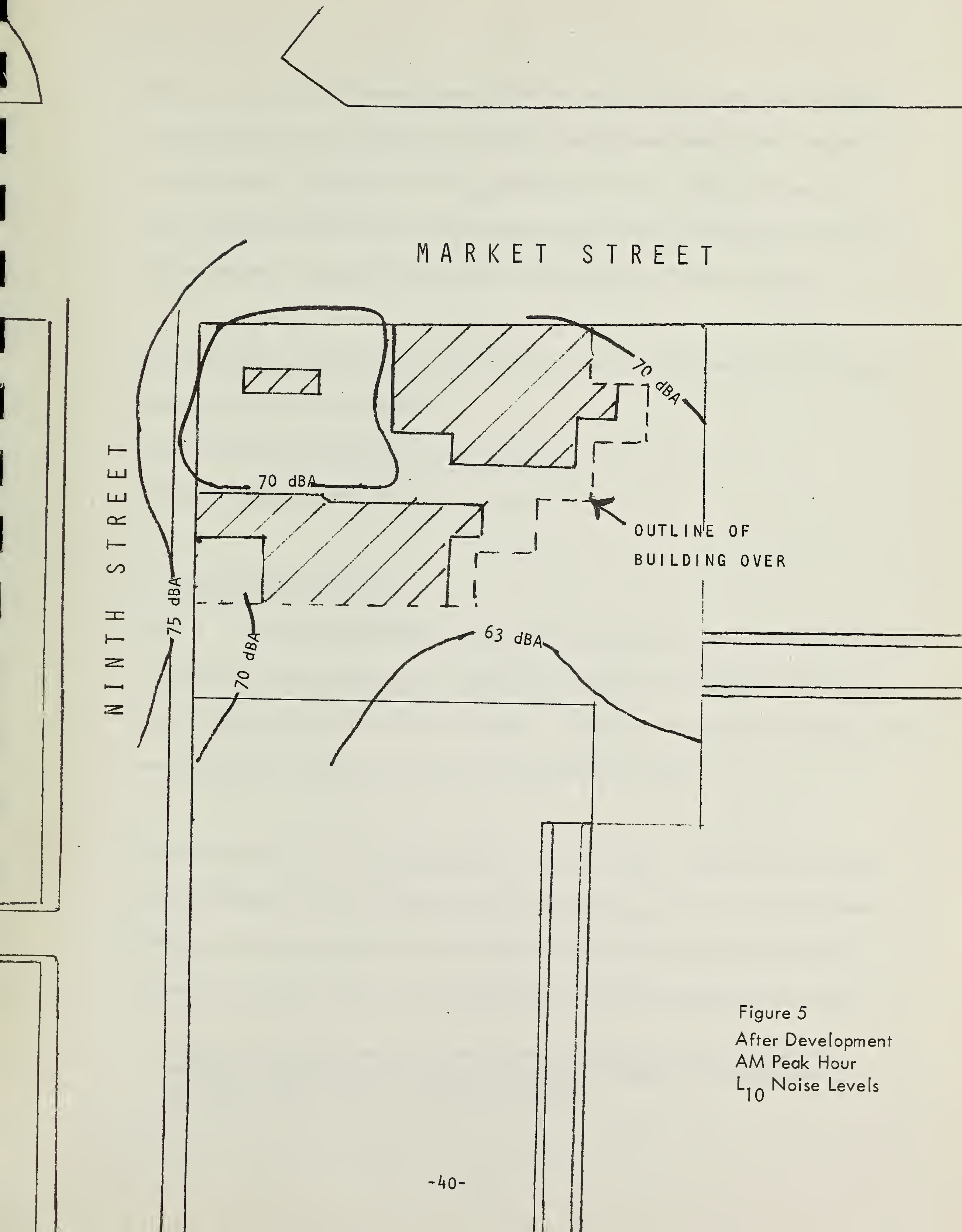


Figure 5
After Development
AM Peak Hour
L_{10} Noise Levels

The noise level would fall approximately 3 dBA for offices 50 feet above street elevation but would decrease only slightly above 50 feet. The Highway Research Board recommends an interior design criterionof 46 dBA (L_{10}) for private offices. Office structures with closed windows generally reduce outside noise levels by 25 dBA. Added noise attenuation may be obtained by double-thickness windows (approximately 10 dBA reduction).

Air conditioner and other building noise would not exceed San Francisco Noise Ordinance criteria for the C3G zoning district:

7AM - 10 PM Maximum 70 dBA at property line

10 PM - 7 AM Maximum 60 dBA at property line

c. Noise During Construction

Table 6 indicates noise emitted by construction activities envisioned for the SCIF Building. The building would be steel frame on spread footings. Steel work riveting and hammering would be the major source of construction noise. No pile driving would be necessary, thereby reducing potential irritation to occupants of surrounding buildings.

The San Francisco Noise Ordinance specifies a maximum 7AM - 8 PM construction noise level of 85 dBA at 100 feet from the source and maximum L_{50} increase of 5 dBA between 8 PM and 7 AM. Impact equipment such as riveters, and jackhammers are exempt from ordinance regulation.* Where other construction activities are expected to cause noise

* Provided that they have approved intake and exhaust noise attenuating mufflers and that pavement breakers and jack hammers are equipped with approved, acoustically attenuating shields.

in excess of ordinance criteria, the standard City practice is for the contractor and City Public Works Department to develop means of reducing noise emissions. Mitigation may include:

- o using hydraulic tools instead of pneumatic impact tools
- o enclosing noisy equipment
- o restricting hours of operation
- o muffling engine noise

TABLE 6

APPROXIMATE NOISE LEVELS DUE TO CONSTRUCTION
SCIF BUILDING, 9th & MARKET STREETS

Construction Activity	Equipment	At 50 Feet from Construction	At 100 Feet from Construction
Excavation & Footings	Mechanical Shovel	76	71
	Back Hoe	85	80
	Bulldozer	94	89*
	Concrete Mixer	75	70
	Concrete Vibrator	64	59
	Trucks	91	86*
	Saws	78	73
	Jackhammer	100	95*
Framing	Rivoting	100	95*
	Trucks	91	86*
	Hammer (Pneumatic)	95	90*
Finish & Clean Up	Compressor	81	76
	Truck	91	86*
	Saws	78	73
	Brooms	80	75

* Denotes noise levels exceeding maximum specified by San Francisco Noise Ordinance; impact equipment such as pile drivers, riveters and jackhammers are exempt from regulation. Contractor would work with Department of Public Works in developing mitigation.

Proposed Federal Highway Noise Standards (Referenced on Page 39.)

At the present time, there is no federal law specifying maximum permissible levels of traffic noise. But a proposed noise standard has been set forth in policy and procedure memorandum No. 90-2, issued April 10, 1972 by the Federal Highway Administration. These standards, shown below, are subject to revision.

Land Use Category	Exterior Design Noise Level*	Examples
A	60 dBA	Amphitheaters, parks or open spaces requiring serenity and quiet.
B	70 dBA	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, recreation areas, playgrounds, active sports areas, and parks.
C	75 dBA	Developed lands, properties or activities not included in A or B.
D	Unlimited	Undeveloped lands.
E	55 dBA (Interior)	Inside public meeting rooms, schools, churches, libraries, hospitals and similar public buildings.

*Noise level can be exceeded 10 percent of the time (L_{10}).

9. CHANGES IN AIR POLLUTION

Of the pollutants emitted by motor vehicles, three are of concern to air quality in the Bay Area: (1) oxidants; (2) sulfur dioxide; and (3) carbon monoxide. Oxidants, a principal ingredient of smog, are a regional phenomenon, formed by chemical reaction of auto emissions in the presence of sunlight many miles from the point of actual exhaust emission. The Project's contribution to the regional oxidant problem is negligibly small; and the components which form oxidants will not be perceived, constitute a health hazard, or cause injury to plants, buildings, etc. within the vicinity of the Project. Sulfur dioxide pollution, largely produced by diesel oil combustion, will not be changed since no significant change in truck/bus traffic is anticipated. Carbon monoxide, a colorless, odorless, tasteless gas which if present in sufficient concentrations can slow a person's response time and aggravate cardiac disability, is the only auto emission of concern to the analysis of air quality within the immediate office building environs (within 0-100 feet of a roadway or parking facility).

An empirical diffusion equation was used to derive rough estimates of what conditions would be like at streetside, primarily for the occupant of adjacent buildings. As a rule, the most conservative assumptions (high pollution estimates) were followed in computing carbon monoxide impacts:

1. Base year - The vehicle mix found on the road in 1973 was used for analysis; replacement of older "dirtier" cars by new "cleaner" cars is reducing average streetside carbon monoxide levels in the Bay Area by 6-8 percent per year; this replacement effect will make actual streetside conditions somewhat cleaner than

projected.

2. Vehicular volume - Carbon monoxide emissions increase in proportion to vehicular volume; estimates of traffic volume were prepared prior to fuel shortages and price increases capable of reducing traffic volumes below that projected.

3. Vehicular speed - Slower speeds cause carbon monoxide increases, e.g., a decrease from 20 to 15 miles per hour causes a 15 percent increase in carbon monoxide at curbside.

4. Traffic congestion - where traffic is stalled by congestion, carbon monoxide levels rise rapidly.

5. Distance between observer and moving traffic - Carbon monoxide diffuses fairly rapidly, with levels 25 feet from the source being 60 percent of mid-street levels, and 50 feet from the source being 35 percent of mid-street levels.

6. Meteorology - Under the worst conditions, namely a wind speed of two miles an hour from the west. Generally, winds of around 10 to 12 miles an hour and fairly unstable (turbulent) atmospheric conditions may be expected at this location, in which case roadside carbon monoxide levels would be approximately 20 percent of the levels computed.

Air Pollution from Project Completion

Project completion is expected to have an insignificant effect on the local air quality. Without an increase in volume of traffic adjacent to the site, no discernable change in ambient carbon monoxide levels would be expected.

The level of carbon monoxide along streets surrounding the Project does not constitute a threat to human health or plant growth. Although computed streetside carbon monoxide levels in one case (on Ninth Street during peak traffic) exceeds the 10 ppm, 8 hour BAAPCD

threshhold for "significant" air pollution*, such standards are set conservatively and do not reflect imminent danger to health. Medical evidence involving cardiac patients supports a carbon monoxide health hazard threshhold of about 40 ppm for 1 hour exposure or 20 ppm for 24 hours -- roughly 3-4 times levels to be generated adjacent the Project.** In human exposure studies on healthy adults, continuous exposure to 50 ppm CO for 90 minutes did interfere with accurate estimation of time intervals.

Plants are relatively insensitive to CO at the lower levels of concentrations that have been found to be toxic to animals, and those concentrations of CO needed to affect plant growth are considerably higher than those normally encountered in ambient air. CO has not been shown to produce detrimental effects on the higher-type plant life at concentrations below 100 ppm, even for short periods of time, a significant impact on vegetation seems improbable.

The maximum 10 ppm CO cited in Table 7 for Ninth Street in the AM peak should be placed in perspective of concentrations of CO in other locations within San Francisco. Most streets in the City which have higher vehicle volumes also have high CO levels, e.g., 19th Avenue, Franklin Street, Fell Street.***

* "Air Pollution and the San Francisco Bay Area," 7th Edition, September, 1972.

** Air Quality Criteria For CO, E.P.A. AP 62, March 1970.

***August 1973 peak hour CO reading at Ellis Street near Van Ness of 6ppm at 100 foot elevation suggests a street level peak hour concentration on the order of 20-30 ppm.

TABLE 7

CARBON MONOXIDE LEVELS:

BEFORE AND AFTER DEVELOPMENT **

	Distance from Curb	AM Peak ppm*	Category
Ninth Street	0 feet	10.8	Significant Air Pollution
	30 feet	5.9	Light Air Pollution
	60 feet	3.2	Clean Air
		Off-Peak	
Ninth Street	0 feet	7.2	Light Air Pollution
	30 feet	4.0	Clean Air
	60 feet	2.2	Clean Air
		AM Peak	
Market Street	0 feet	3.7	Clean Air
	30 feet	2.0	Clean Air
	60 feet	1.1	Clean Air
		Off-Peak	
Market Street	0 feet	2.7	Clean Air
	30 feet	1.5	Clean Air
	60 feet	0.8	Clean Air

* Sensor assumed 3 feet above road surface; concentrations developed from General Electric Company Study of Air Pollution Aspects of Various Roadway Configurations, New York, 1971.

** No change between levels calculated for locations shown before development and those calculated for same locations after development.

Air Pollution During Construction

The principal pollutants produced by construction equipment and vehicles are sulfur oxides, nitrogen oxides and hydro-carbons. As the majority of construction equipment is now diesel powered, carbon monoxide and hydro-carbon emission levels will be less than those from standard gasoline engine powered equipment. Sulfur oxides, however, will increase due to the higher sulfur content of diesel fuel. An abundance of particulates would occur during the excavation for the office building, in addition to particulates generated by construction equipment. At this time, however, there are no mathematical models available which can be used to estimate what these particulate levels might be.

Measures commonly required to reduce air pollution during construction include:

(1) Installation and utilization of recent improved needle valve injectors in diesel construction equipment and trucks where applicable.

(2) Periodic checking of construction equipment to insure that malfunctioning equipment will not be used.

(3) Requiring grading and excavation areas and dirt/sand piles to be water sprayed during dry windy weather to reduce dust generation.

(4) Requiring sand, gravel and earth hauling equipment and trucks to water-spray and tarpaulin cover loads to be carried on public streets and highways.

(5) Requiring trucks leaving the site to be hosed down sufficiently to prevent the spreading of construction debris on adjacent streets.

10. MITIGATION OF ADVERSE TRANSPORTATION IMPACTS

Adverse Impacts on the Transportation System include increased demand for transit service, an increase in the local parking deficiency, and occasional delays to traffic on Ninth Street when trucks reverse into the loading dock.

Transit service is currently undergoing a major refurbishing, and it is not anticipated that any difficulty would be experienced in meeting the increased demand The parking deficiency is a problem common to all of downtown San Francisco, and it is not anticipated that any practical solution will be developed. We propose that a red curb zone be created on Ninth Street between the Project basement access and the bus zone at Market Street to facilitate the maneuvering of trucks into the loading dock. This zone is indicated in Figure I in this report. Since the number of large trucks (40 feet or more) needing to use the loading dock would probably be less than 4 per day, and since most small deliveries could be handled via either the loading dock or the basement parking levels, it would be feasible to restrict use of the loading dock to oversize vehicles or large loads, should use of the dock prove to interfere unduly with traffic on Ninth Street.

It would be desirable to designate a passenger loading zone on Market Street just east of the bus zone. However, this requires no advance planning, and may be installed if conditions develop to warrant it.

APPENDIX C

EE 74.71

WIND TUNNEL STUDY AND COMFORT ANALYSIS

ENVIRONMENTAL IMPACT PLANNING CORPORATION
319 Eleventh Street
San Francisco, California 94103

June 18, 1974

TABLE OF CONTENTS

I. INTRODUCTION

The interaction between the natural wind and structures in an urban area is quite complex. Because of this complexity and the varied characteristics of the wind itself, architects and city planners are unable to determine the effect of a proposed structure on the local wind environment during design and planning with the type of information usually available. This situation can result in adverse wind conditions being created for pedestrians when the structure is built. At this point, remedial measures are usually quite costly to implement, if they exist at all.

Fortunately, modeling of winds around buildings and in cities is possible through use of wind tunnel facilities and capabilities for simulating natural winds. Mean wind speed can be accurately measured for a wide range of meteorological conditions found at a particular site using a scale model. An advantage of this technique is that it allows evaluation of environmental effects of modifications to the proposed project before the cost of construction has been realized.

Data from wind tunnel tests can be combined with climatological data to quantify the effect of a proposed structure on pedestrians in terms of human comfort. The frequency distribution of wind strengths at pedestrian level, when combined with temperature data and shadow patterns of the proposed structure, can be used to forecast pedestrian comfort near the building in terms of percentage of time that discomfort is experienced.

II. BUILDING AND SITE DESCRIPTION

The site of the proposed State Compensation Insurance Fund building is at the northeast corner of the intersection of 9th Street and Market Street, near the San Francisco Civic Center. Directly west of the site is Fox Plaza, while the Civic Auditorium is to the northwest. Several smaller buildings lie to the north and east, with multistory buildings to the northeast and southwest. The site is presently used as a parking lot.

The proposed building is 16 stories high, which puts it above all nearby buildings except for Fox Plaza. A distinctive series of terraces is proposed on the north and east faces (see Figure 2). A landscaped plaza area is included in the plans for the eastern portion of the site. A bridge on the northern side of the building connects the State Compensation Insurance Fund (SCIF) building with a hotel to the north.

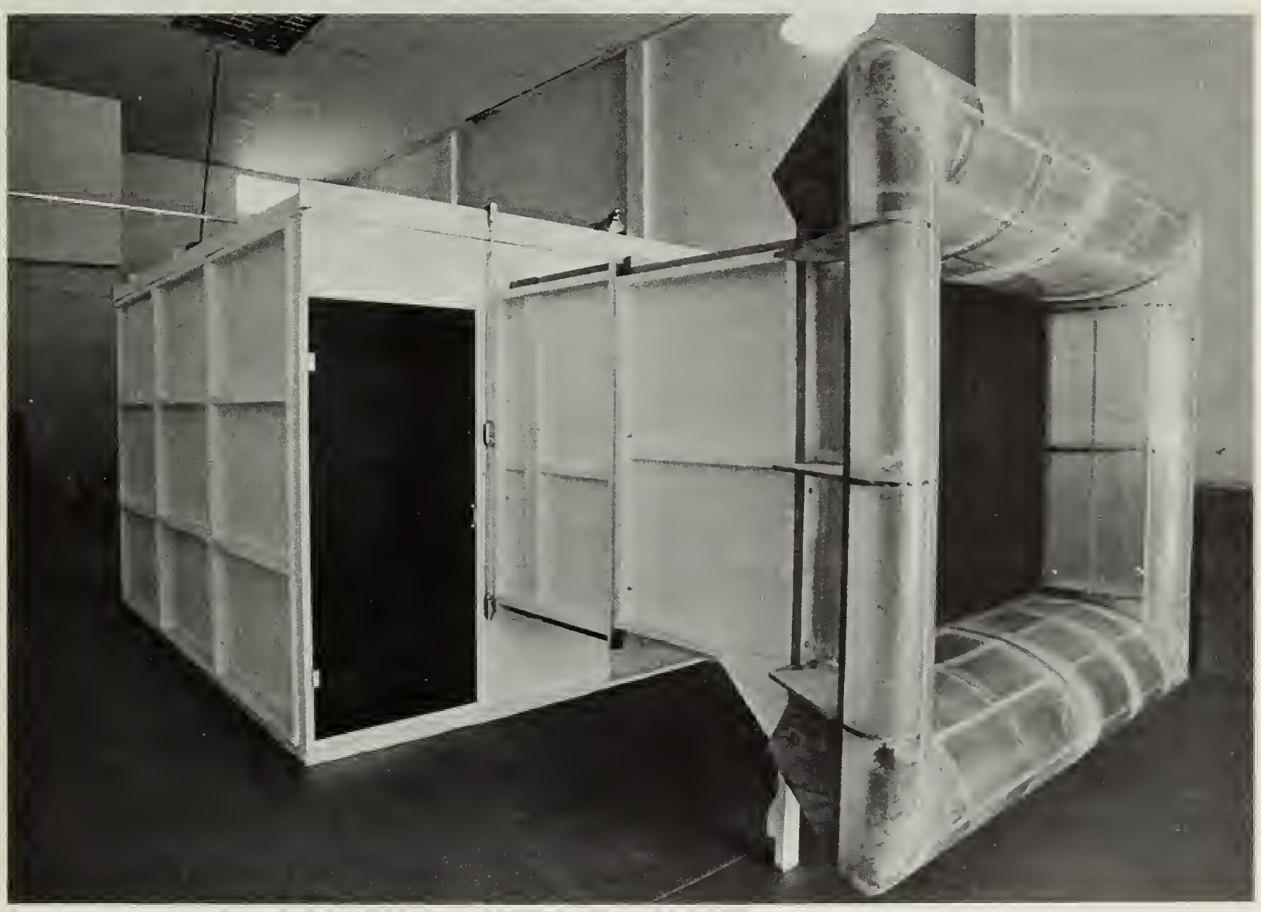


FIGURE 1 - EIP Boundary Layer Wind Tunnel Facility.

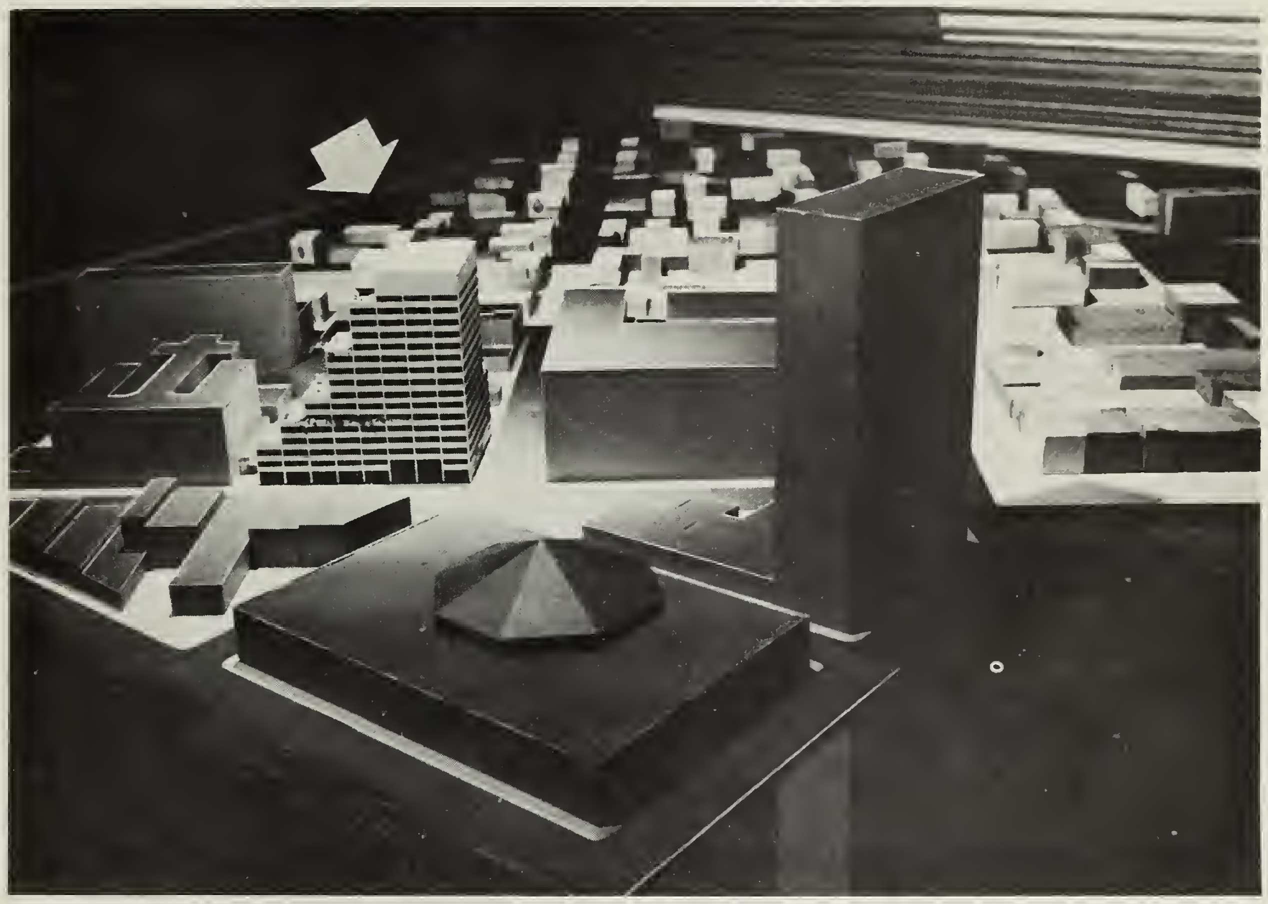


FIGURE 2 - SCIF Building in wind tunnel, with surrounding city model. Wind profile-producing slats are visible in rear.

III. MODEL AND WIND TUNNEL FACILITIES

Model

A cardboard model of the proposed building and nearby structures was provided by the architect (see Figure 2). A model of the structures surrounding the area was constructed out of wood and polyurethane foam for a distance of several blocks.

The model scale was 1 inch equals 30 feet. The model of the surrounding city area was built to this scale, with building configurations and heights obtained from San Francisco Planning Department maps.

The model of the proposed State Compensation Insurance Fund building was placed in Environmental Impact Planning's (EIP) boundary layer wind tunnel on a circular piece of Mylar. This allowed the model to be turned to simulate the various wind directions.

Wind Tunnel Facilities

The EIP wind tunnel was designed specifically for testing of architectural models. The working section is 7 feet by 14 feet. Wind velocities in the tunnel can be varied from 3.5 mph to 11 mph. The flow characteristics around sharp-edged objects such as architectural models is constant over the entire speed range. Low speeds are used for photographing tracer smoke; high speeds are used for windspeed measurements.

Simulation of the characteristics of the natural wind is facilitated by a series of adjustable slats, baffles and perforated screens upwind of the test section. These allow adjustments in wind characteristics to provide for different scale models and varying terrain upwind of the project site.

Measurements of windspeed around the model are made with a hot wire anemometer. The flow above the city is measured by

a pitot tube connected to a micromanometer. Flow visualization is achieved by use of a smoke generator in conjunction with a Nikon 35 mm camera and a system of photographic spotlights.

IV. TESTING METHODOLOGY

Simulation of Flow

The most important factor in assuring similarity between flow around a model in a wind tunnel and flow around the actual building is the structure of the approach flow and geometric similarity between the model and the prototype. A theoretical discussion of the exact criteria for similarity is not included in this paper but may be found elsewhere (Cermak, 1966, or Cermak and Arya, 1970).

The variation of windspeed with height (wind profile) was adjusted for the scale of the model and the type of terrain upwind of the site by a system of horizontal slats, shown in Figure 2. The profile used was that generally accepted as representing flow over an urban area (Lloyd, 1967).

Testing Procedure

The wind flow characteristics of the site in its present state were investigated to ascertain the present wind environment. Windspeeds and wind directions at specified points throughout the site were measured and recorded. Wind direction was measured by releasing smoke at each point and recording the direction the smoke traveled. Windspeed measurements were made at the same points at a scale height of 5 feet above the ground. A hot wire anemometer probe was used, and speeds were read directly off the meter.

A similar technique was used to measure the wind environment with the model building in place. Measurements were taken along the sidewalks on 9th Street and Market Street in the plaza area, and at each of the terraces.

Before and after each test run, a "reference speed" measurement was made upwind of the model. This measurement was made at a scale height of 132 feet above the ground, corresponding to the height of the U.S. Weather Service wind instrumentation located on the Federal Building at 50 Fulton Street. The

purpose of these measurements was to relate the wind tunnel measurements to actual wind records.

V. TEST RESULTS AND DISCUSSION

Tests of windspeed and direction were conducted for five wind directions. A complete set of measurements was taken for northerly, northwesterly, westerly, southwesterly and southerly wind directions. (In meteorology a north or northerly wind blows from the north.) Winds with easterly components were excluded for several reasons. Investigation of wind data revealed that easterly winds are not common and are seldom strong, averaging only 6 miles per hour, while northwesterly winds average 14 miles per hour. Also, the terraced structure of the eastern half of the building is such that easterly winds would not be expected to cause adverse wind conditions at street level.

For display purposes, measured windspeeds have been expressed as fractions of the reference windspeed. Thus, a plotted value of .52 means that the measured windspeed was 52% of the reference windspeed. Since the reference windspeed corresponds to the actual wind at 50 Fulton Street measured at 132 feet above the ground, the wind at the actual building could be expected to be 52% of the wind recorded by the Weather Service.

Wind direction is indicated by an arrow pointing in the direction of flow. At points where direction was variable, a "v" has been plotted and the arrow omitted.

North Wind

North wind conditions are infrequent, occurring between 2% and 4% of the time, depending on the season.

The results of the tests under north wind conditions are shown in Figures 3 and 4. Figure 4 shows that the presence of the proposed building will slightly increase winds along Market Street near the north end of the structure but reduce considerably winds near the south end of the building. Winds along 9th Street will be the same magnitude, but wind direction will change from northerly to easterly. The

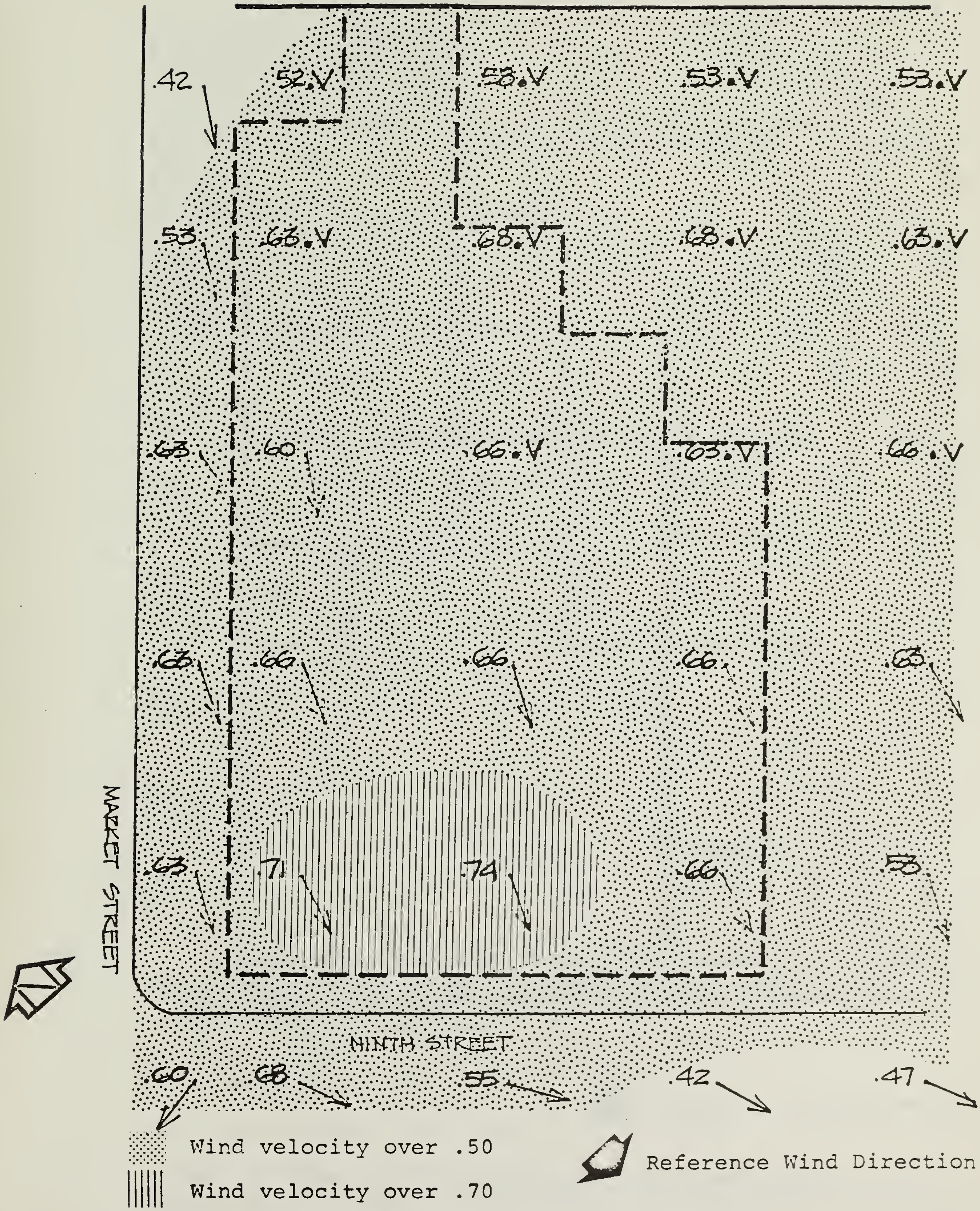
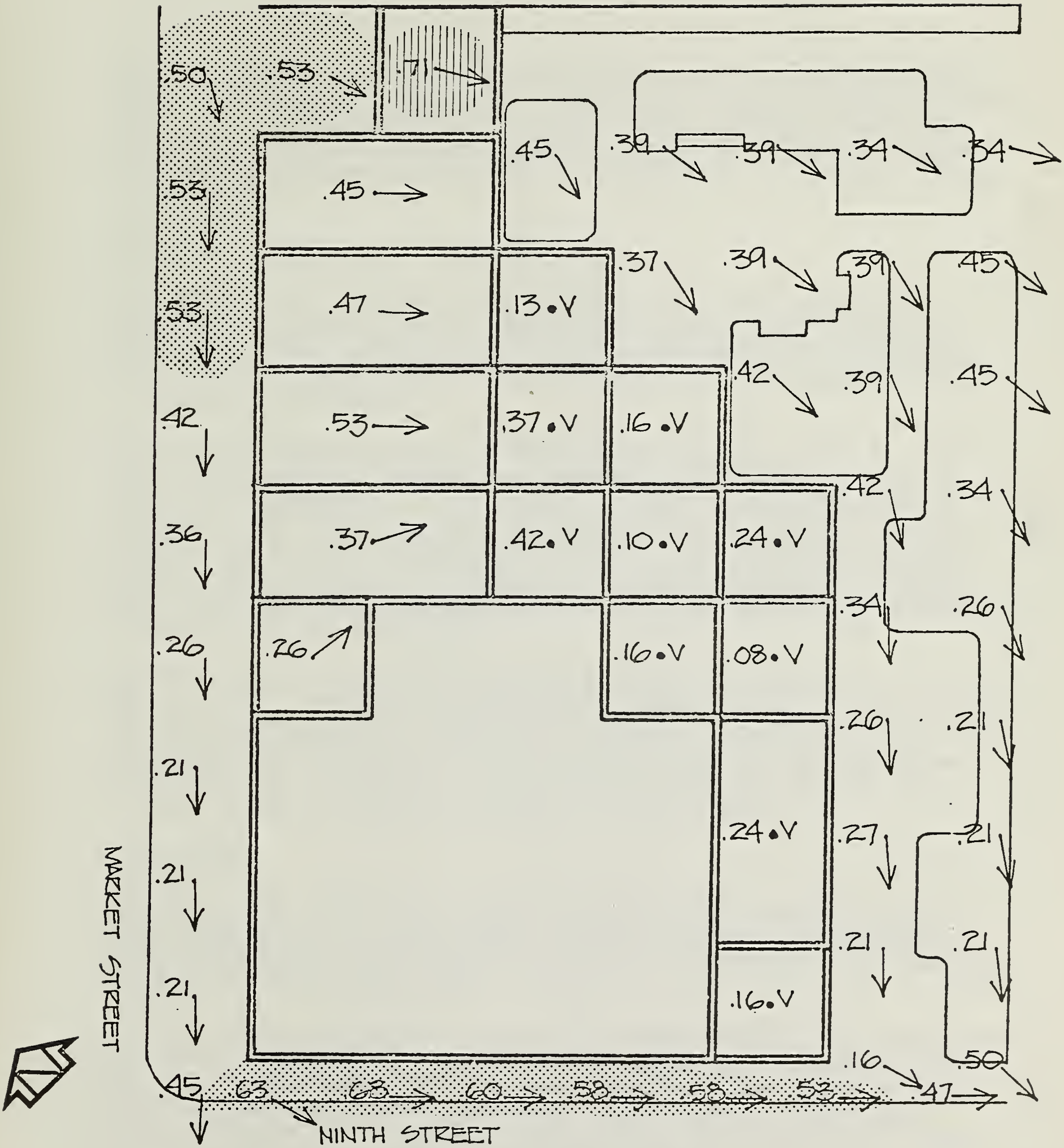


FIGURE 3 - Site without building. North wind.
Windspeeds are expressed as a fraction of Reference Windspeed.



Wind velocity over .50

Wind velocity over .70

Reference Wind Direction

FIGURE 4 - Site with proposed building. North wind.
Windspeeds are expressed as a fraction of Reference Windspeed.

plaza area will experience relatively light winds, as will the terrace areas, with the exception of those with a western exposure. Under these wind conditions, higher windspeeds can be expected on the bridgeway on the north side of the building, compared to the wind measured on the site without the building.

Northwest Wind

Northwest winds occur quite frequently in San Francisco, occurring between 12% and 39% of the time, depending on the season, and may be very strong, averaging 14 miles per hour and sometimes exceeding 3 miles per hour, especially in spring and summer.

Under northwesterly wind conditions (Figures 5 and 6) wind near the north end of the structure will increase dramatically. A windward "roller" can be expected to form, as evidenced by the flow away from the building along Market Street. Near the intersection of Market and 9th, however, windspeeds are greatly diminished. Winds along 9th Street will increase, while windspeeds in the plaza and protected terraces will be reduced.

Figures 7 and 8 display graphically the formation of a windward roller. Figure 7 shows smoke being released upwind of the site without the building. Figure 8 shows the flow with the building included. This roller, typical of high-rise buildings, can sometimes cause pedestrian discomfort by lifting leaves, dust and debris into the air.

West Wind

Westerly wind conditions occur between 15% and 40% of the time, depending on the season. West winds are dominant in spring and summer and are frequently strong, with an average speed of 13 miles per hour.

The wind flow patterns at the site under west wind conditions are shown in Figures 9 and 10. In general, windspeeds are light in both cases, due to the fact that the site is sheltered by the Fox Plaza building. A windward roller has formed along Market Street, but windspeeds are lighter than the northwest wind case. The plaza and terraces are well sheltered.

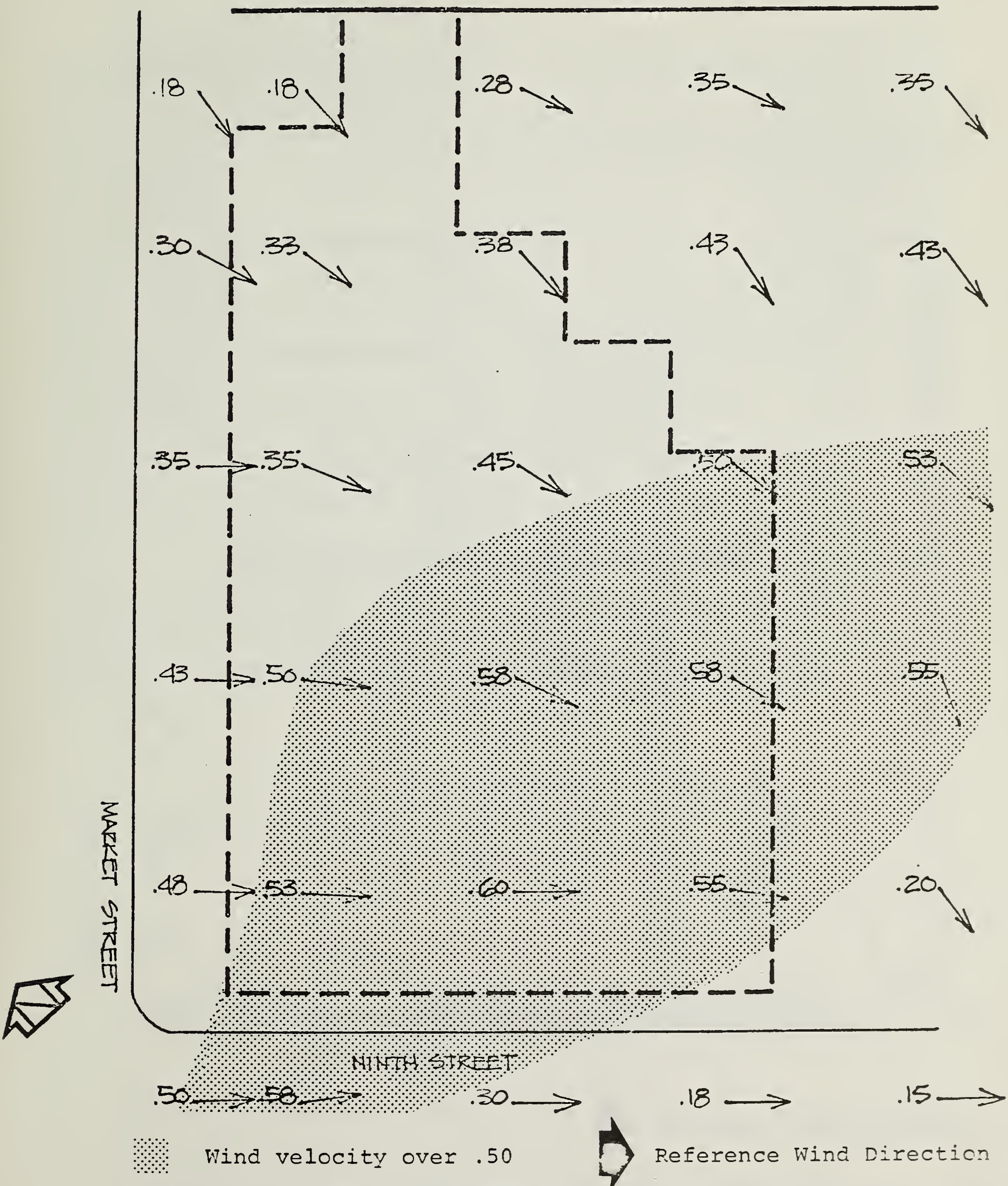
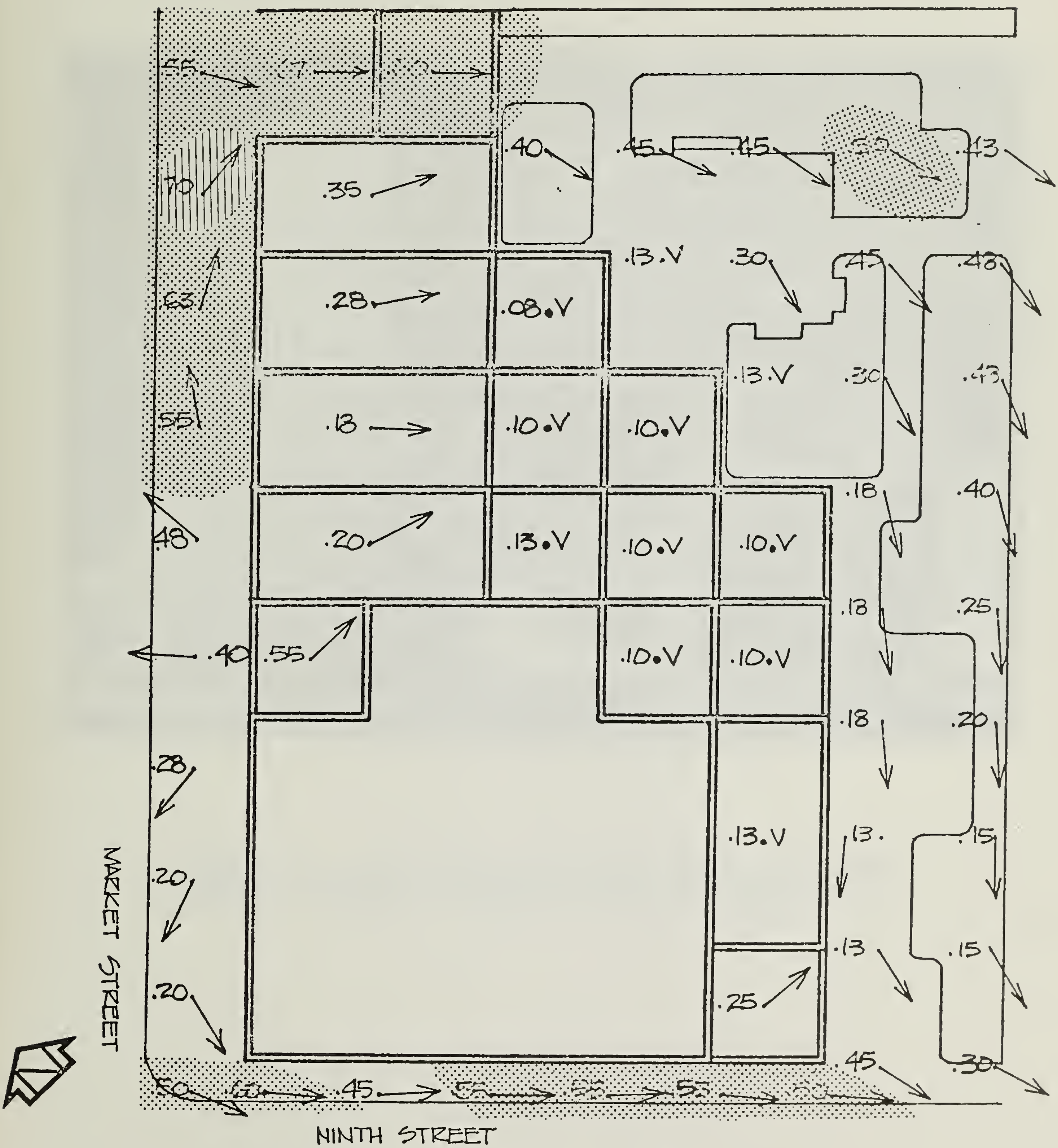


FIGURE 5 - Site without building. Northwest wind.
Windspeeds are expressed as a fraction of Reference Windspeed.



Wind velocity over .50

Wind velocity over .70

Reference Wind Direction

FIGURE 6 - Site with proposed building. Northwest wind. Windspeeds are expressed as a fraction of Reference Windspeed.

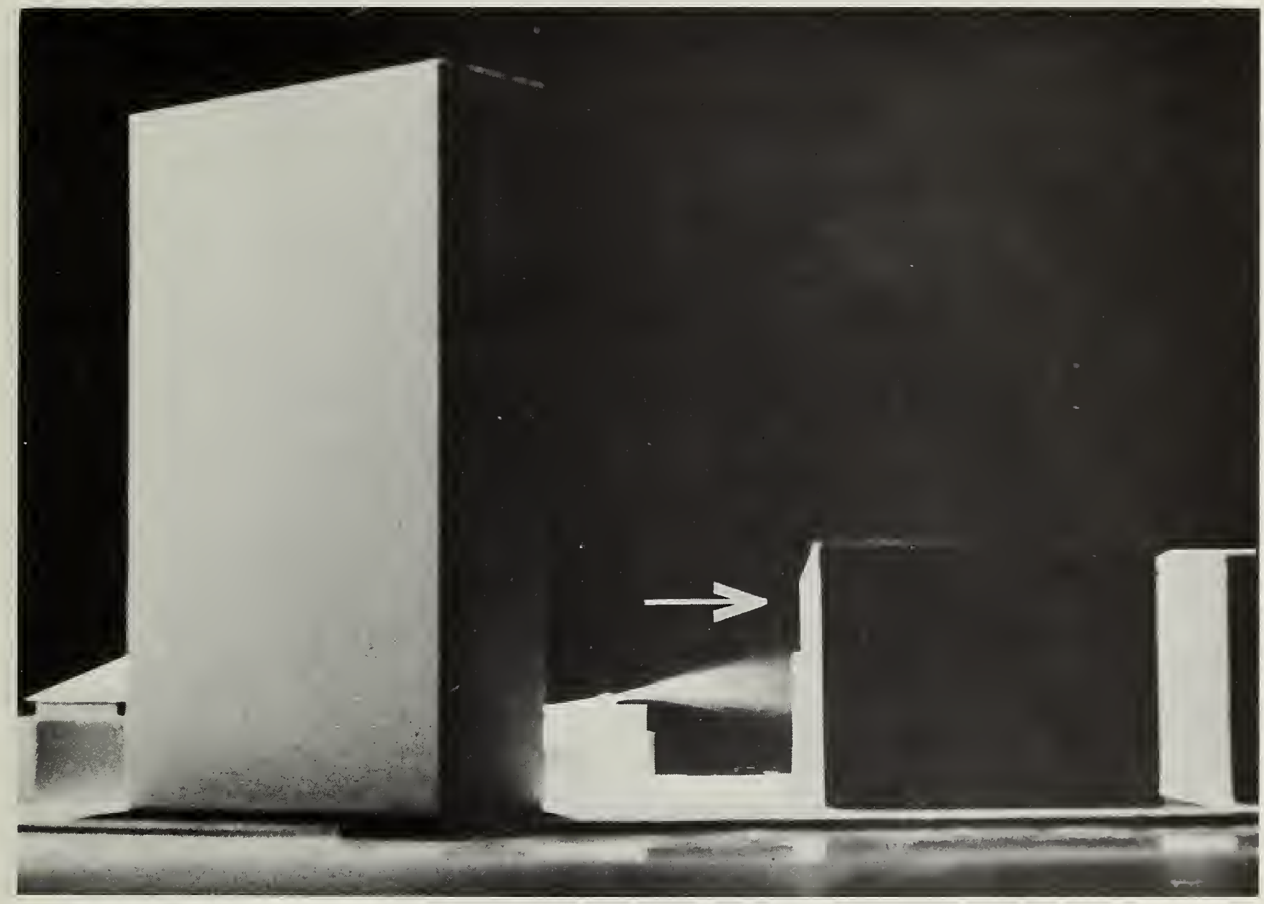


FIGURE 7 - Northwest wind conditions, building absent, looking northeast up Market Street.

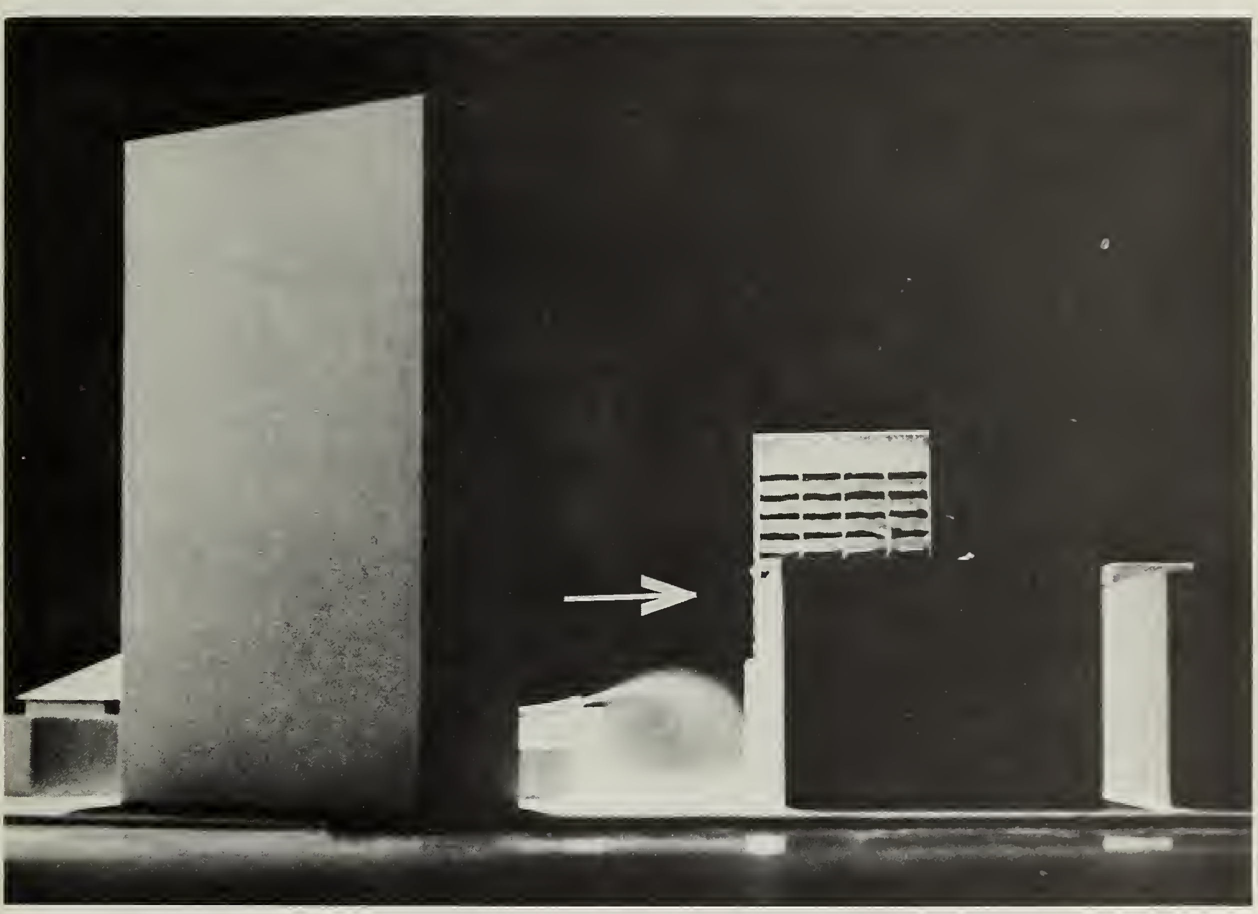


FIGURE 8 - Northwest wind condition, building in place, looking northeast up Market Street. Note formation of "roller" in front of building.

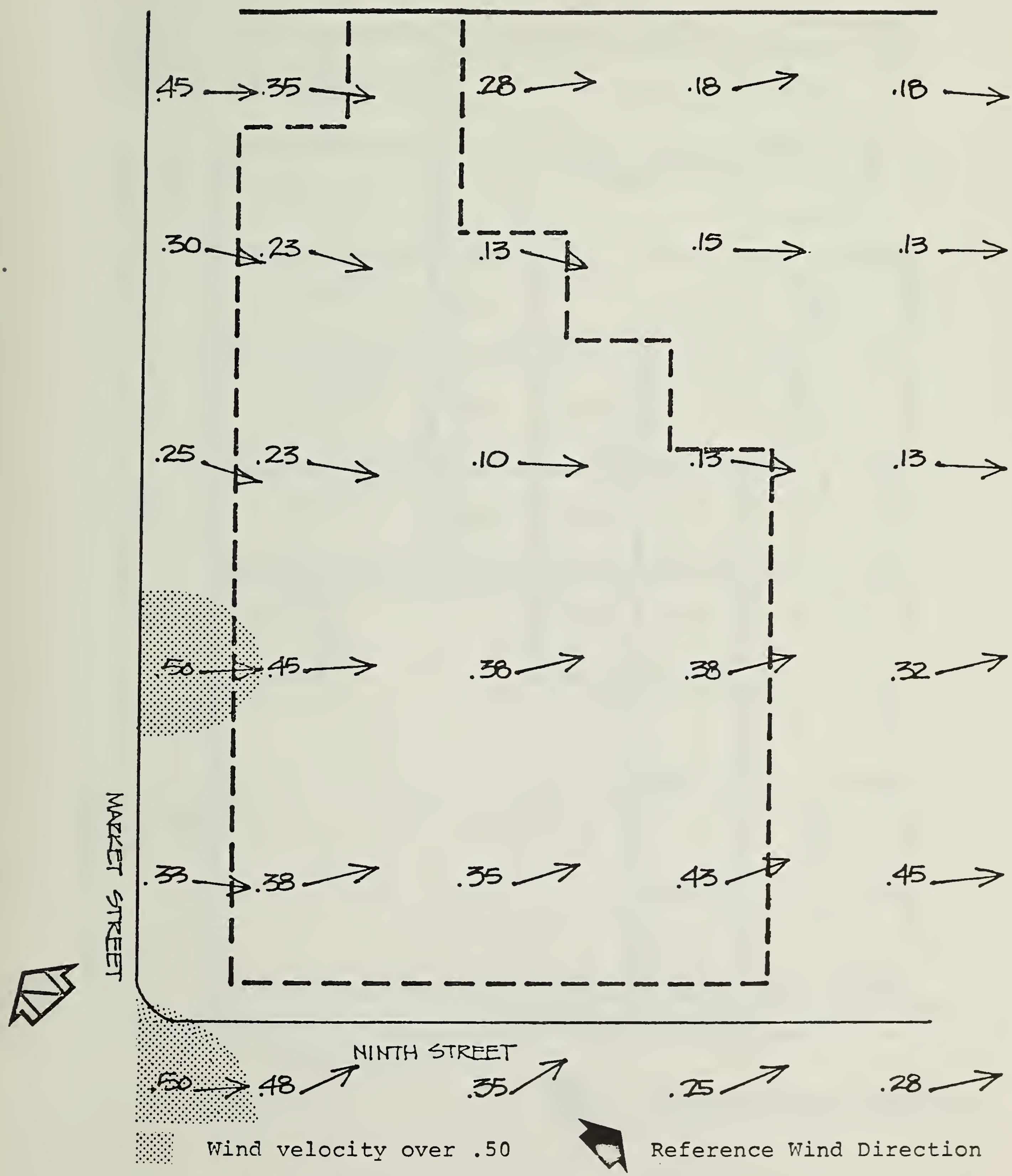


FIGURE 9 - Site without building. West wind.
Windspeeds are expressed as a fraction of Reference Windspeed.

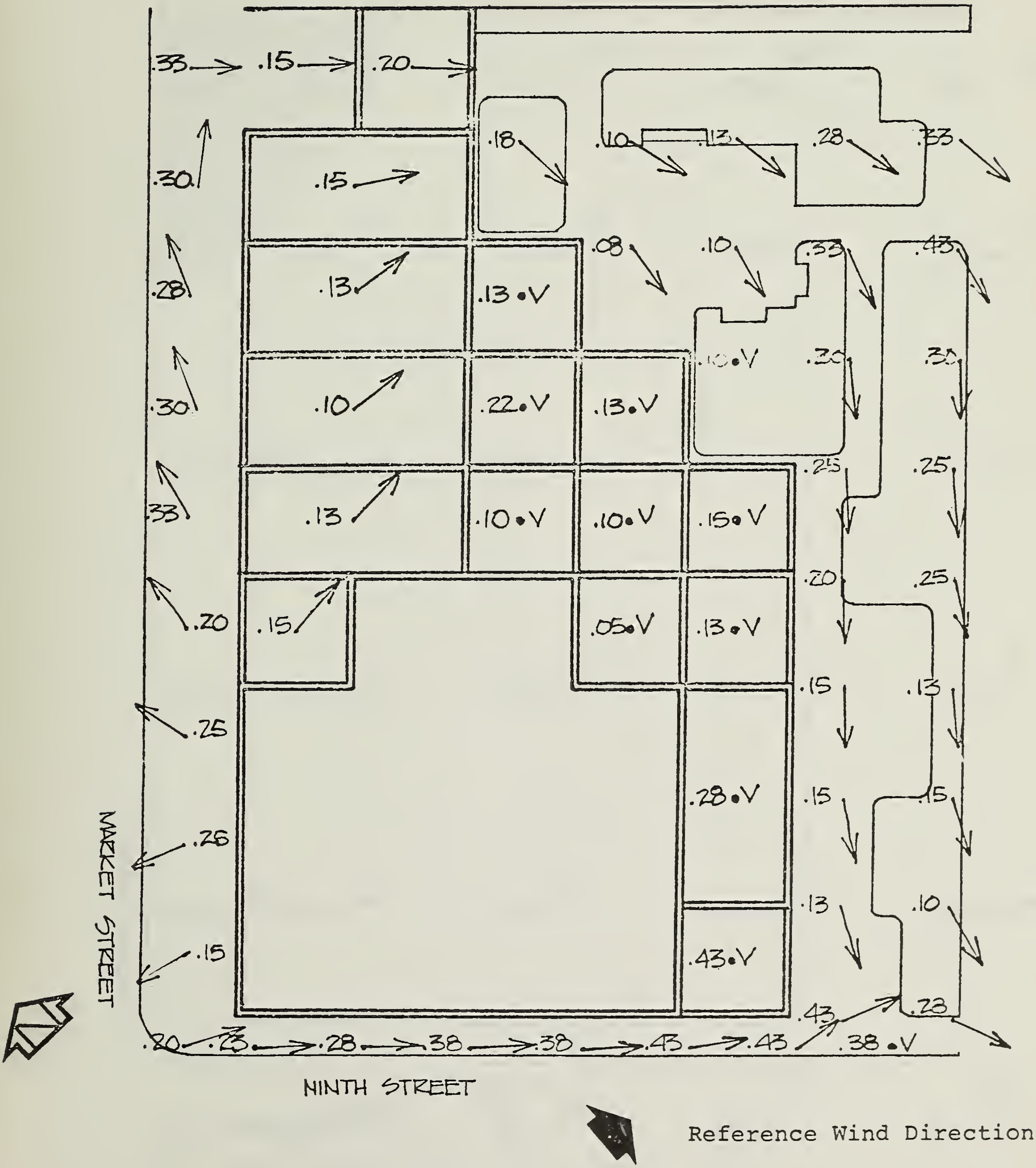


FIGURE 10 - Site with proposed building. West wind. Windspeeds are expressed as a fraction of Reference Windspeed.

WIND TUNNEL STUDY
SCIF Building

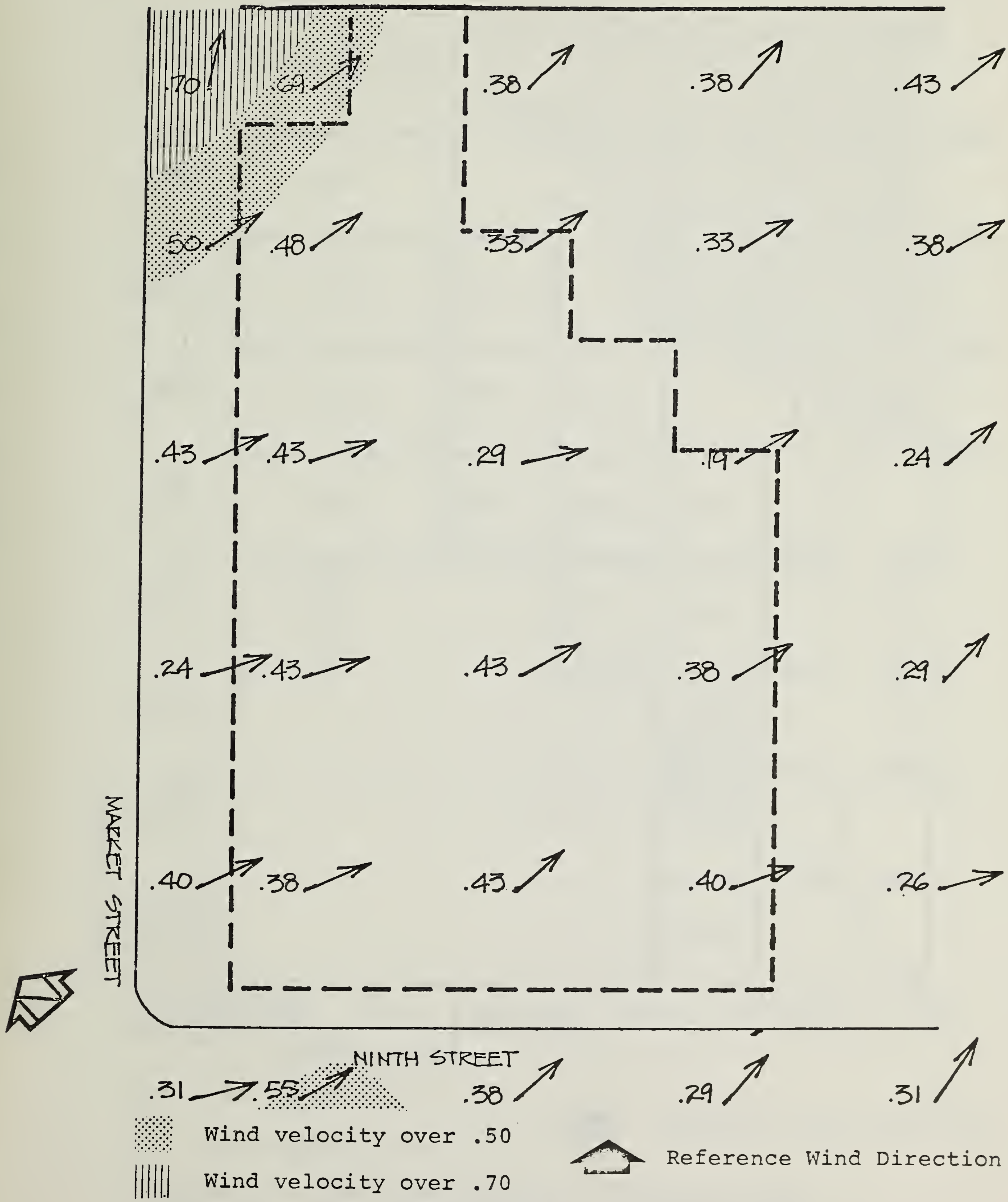
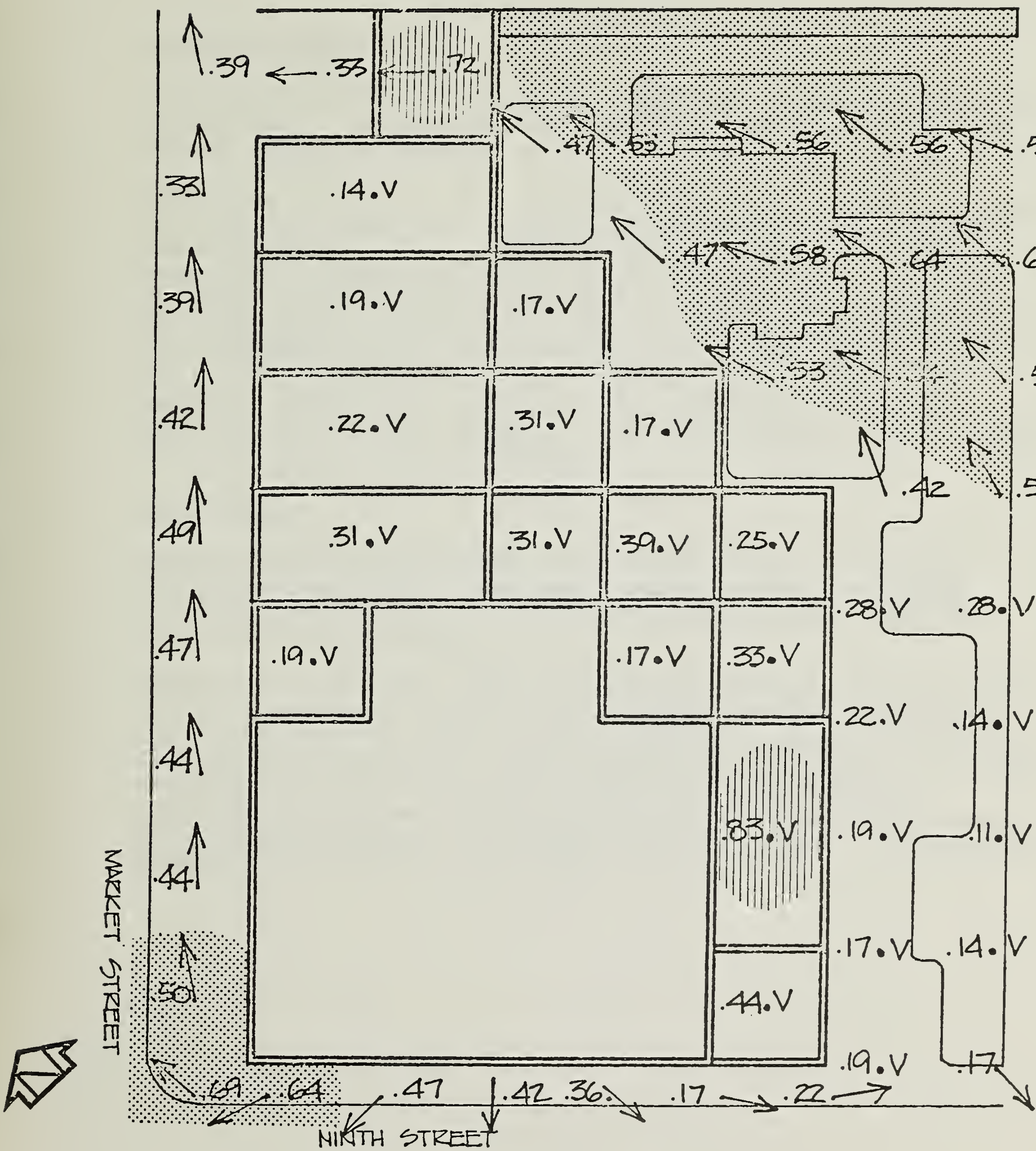


FIGURE 11 - Site without building. Southwest wind. Windspeeds are expressed as a fraction of Reference Windspeed.

WIND TUNNEL STUDY
SCIF Building



Wind velocity over .50

Wind velocity over .70

Reference Wind Direction

FIGURE 12 - Site with building. Southwest wind.
Windspeeds are expressed as a fraction of Reference Windspeed.

Southwest Wind

Southwest winds are relatively frequent, occurring about 10% of the time. During winter, southwest winds associated with storms can be extremely strong.

Wind flow patterns under southwest wind conditions are shown in Figures 11 and 12. Along Market Street, winds will be more northerly, but speeds will be comparable. A dramatic decrease in speeds near the northern part of the site is expected, with a slight increase in speed along 9th Street. The development of a roller along 9th Street can be seen in the reversed flow in front of the building. Winds in the plaza area will be high and will be blowing in a more easterly direction. Winds on the bridge will be high, while the terraces will be generally well sheltered except along the east side of the building.

South Wind

South winds are infrequent in San Francisco, occurring between 1% and 12% of the time, depending on the season. Southerly winds are most frequent during winter and are associated with storms.

Figure 13 shows that under present conditions, a south wind can be expected to produce high windspeeds at the project site. The flow is also very distorted by nearby buildings, with direction varying from southerly to northerly. If the proposed building were constructed, Figure 14 reveals that winds would be reduced greatly at street level, except near the intersection of Market and 9th Street. Winds along Market Street will be very low.

WIND TUNNEL STUDY
SCIF Building

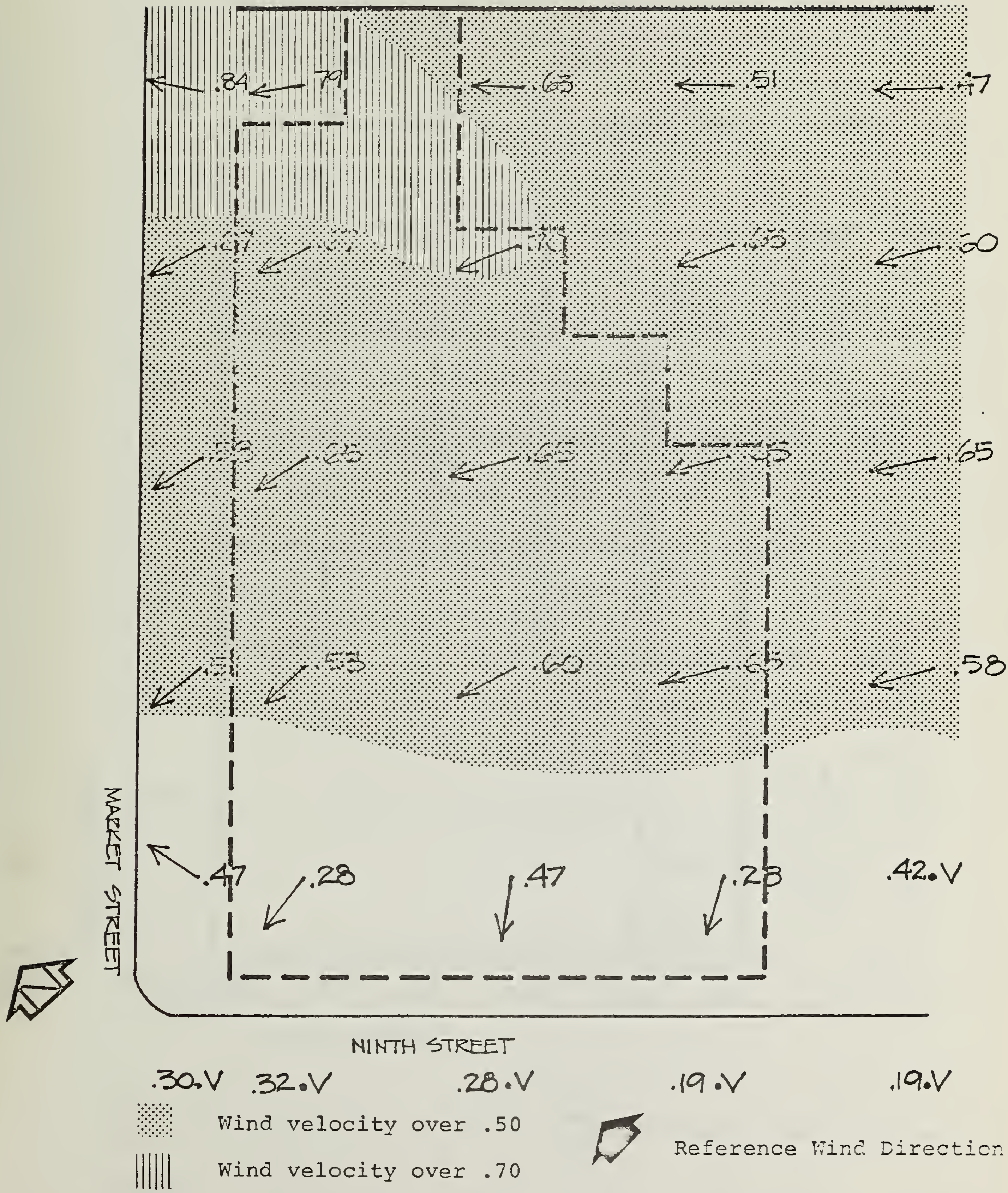
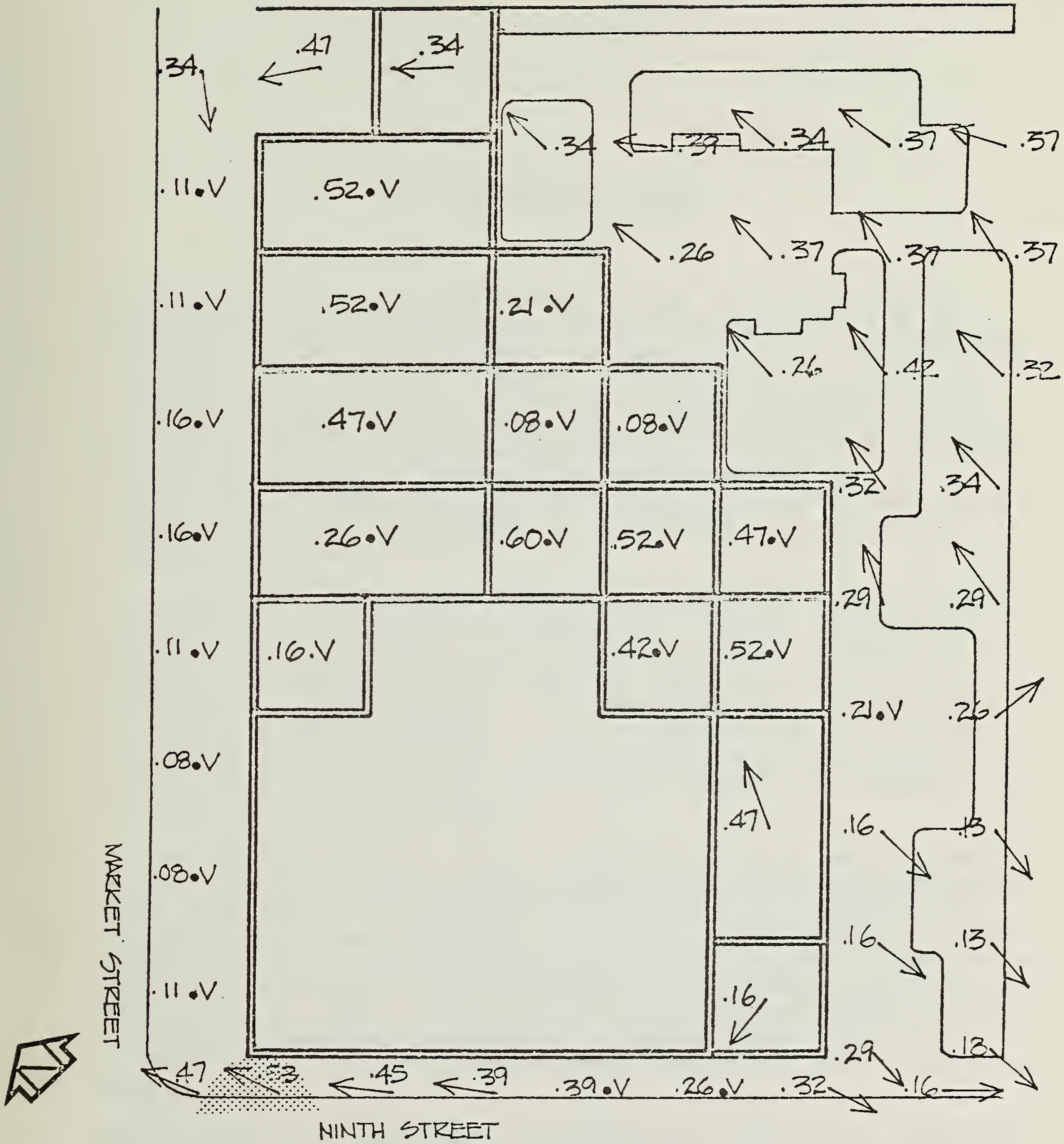


FIGURE 13 - Site without building. South wind.
Windspeeds are expressed as a fraction of Reference Windspeed.



Wind velocity over .50 — Reference Wind Direction

FIGURE 14 - Site with proposed building. South wind. Windspeeds are expressed as a fraction of Reference Windspeed.

VI. COMFORT ANALYSIS

While wind velocities themselves are of use and interest, they do not give complete information on the effect of a building on the local climate or the effect of that climate on human comfort. The elements of climate which affect comfort are temperature, humidity, sunshine, precipitation and wind. Their relative importance varies with the geographical location and the characteristics of the local climate. There are methods of controlling these factors, but in an outdoor environment the only factors which can be manipulated substantially are the degree of exposure to precipitation, sunshine and wind.

In order to assess human comfort, a variety of climatic and physical factors must be considered. Comfort and discomfort in the wind is determined by physical effects (flapping clothing, blowing dust) and thermal cooling. The physical effects are usually assumed to occur above a velocity limit of about 12 mph (Penwarden, 1973); thermal cooling is more important at lower speeds. The rate of thermal cooling is dependent on the activity and clothing levels of pedestrians, as well as climatic factors.

Calculations of human comfort frequencies have been prepared using a series of physical and empirical relationships which take into account thermal cooling, windspeed, temperature, clothing level and pedestrian activity (Arens, 1972). These computations were carried out for a level of activity expected at the site of window shopping, standing holding parcels, or walking at 2.5 mph. The level of clothing was assumed to be a standard American business suit during fall, spring and summer and a slightly higher level (overcoat, hat) during the winter.

Using shadow photographs provided by the architect, areas of sun and shade were plotted for each day and hour of interest. Combining this information with temperature data, a maximum permissible windspeed for comfort is defined at each point of interest. Using climatological data for the appropriate

season and hour of the day, and the data obtained in the wind tunnel research, the percentage of time that the maximum permissible wind is exceeded is calculated. These are calculated for each wind direction at each point, then are weighted by the frequency of each wind direction for that particular season. The result is a description of the percentage of time that discomfort is experienced at the site and the probability of discomfort being experienced during selected hours of the day.

Climatic Data

Wind data are available from the Federal Building on Fulton Street. These data, however, have not been analyzed extensively and are only given in terms of monthly averages. Extensive data are available, however, from the San Francisco International Airport. The airport data are ideally suited to this type of study because the frequency of windspeeds for each season as well as for morning, afternoon and evening has been derived. It was therefore decided to relate the Federal Building data to the airport data. In general, the data showed that windspeeds at the airport were greater than those measured downtown, but otherwise there was a good correlation. This would be expected as both areas are dominated by the same climatic conditions. By reducing the windspeeds at the airport by 20%, a good estimate of windspeed frequency at downtown San Francisco was obtained.

Interpretation of Results

The calculations were carried out assuming a sunny day with near normal temperatures. The comfort frequencies are for the average pedestrian, who is dressed in usual clothes for the particular season.

Cloudy days will cause higher frequencies of discomfort in areas normally in sunshine. Also, rainfall will affect pedestrian comfort, although it is reasonable to assume that rainfall causes all outdoor spaces to be uncomfortable. Calculations of discomfort frequency have been made for 1 p.m. for all four seasons. In addition, morning and evening analyses were carried out for winter and summer.

Winter

Discomfort frequencies for a winter morning are given in Figure 15. The cool temperatures of this time result in

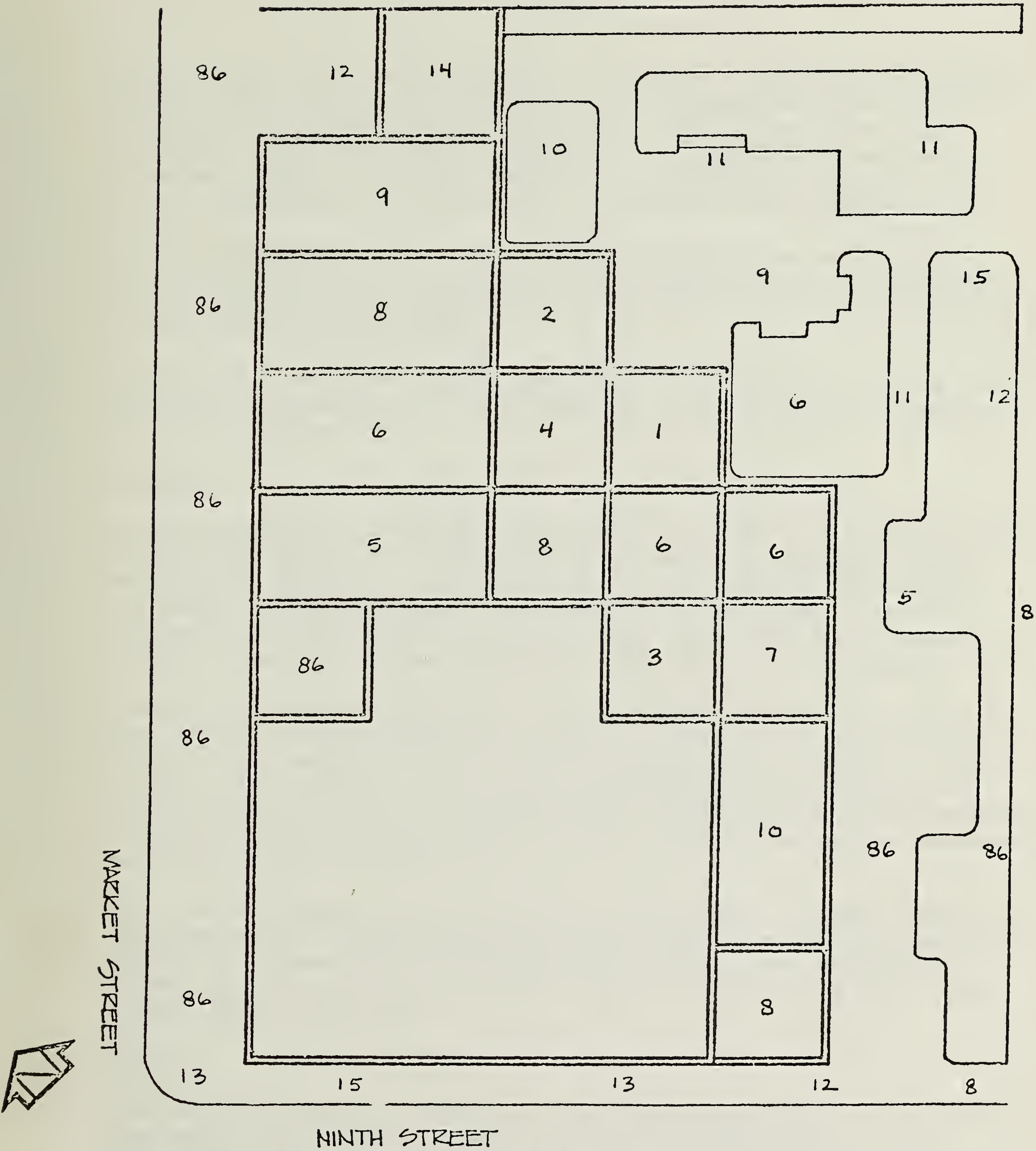


FIGURE 15 - Comfort Diagram for Winter, 9 A.M. Figures are percentage of time that discomfort will be experienced.

high frequencies of discomfort in areas shaded by buildings. Those areas exposed to the sun but protected from the wind show low frequencies of discomfort. The plaza area and terraces fall into this category. It should be realized, however, that if cloudy conditions exist, those areas will have frequencies of discomfort similar to the shaded areas.

Winter afternoon conditions (Figure 16) shows relatively low frequencies of discomfort in all areas around the site. This is to a large part due to the relatively low windspeeds that occur during winter.

Winter evening conditions are shown in Figure 17. Most areas have low frequencies of discomfort, with a greater frequency along 9th Street.

Summer

Summer morning conditions are shown in Figure 18. Relatively high frequencies of discomfort are found in shaded areas along Market Street and 9th Street. The higher windspeeds of summer cause comfort to be actually less than during winter. The frequent fog would also be expected to cause higher discomfort frequencies in the plaza and terraces.

Summer afternoon conditions are shown in Figure 19. This is the period of the greatest sunshine but also the greatest wind. The result is that areas experiencing relative high winds under westerly conditions (9th Street, north end of site, bridge) will experience high frequencies of discomfort. Comfort on the terraces is variable, with discomfort increasing with exposure to the west.

The cooler temperatures and high windspeeds of late summer afternoons will cause frequent discomfort around the building. Figure 20 shows that the most comfortable area will be on Market Street near 9th, where the bulk of the building has slowed down the wind.

Spring

Spring afternoons in San Francisco are generally windy, with the result that shady areas will be uncomfortable a good portion of the time. Figure 21 shows that the plaza area will be quite comfortable.

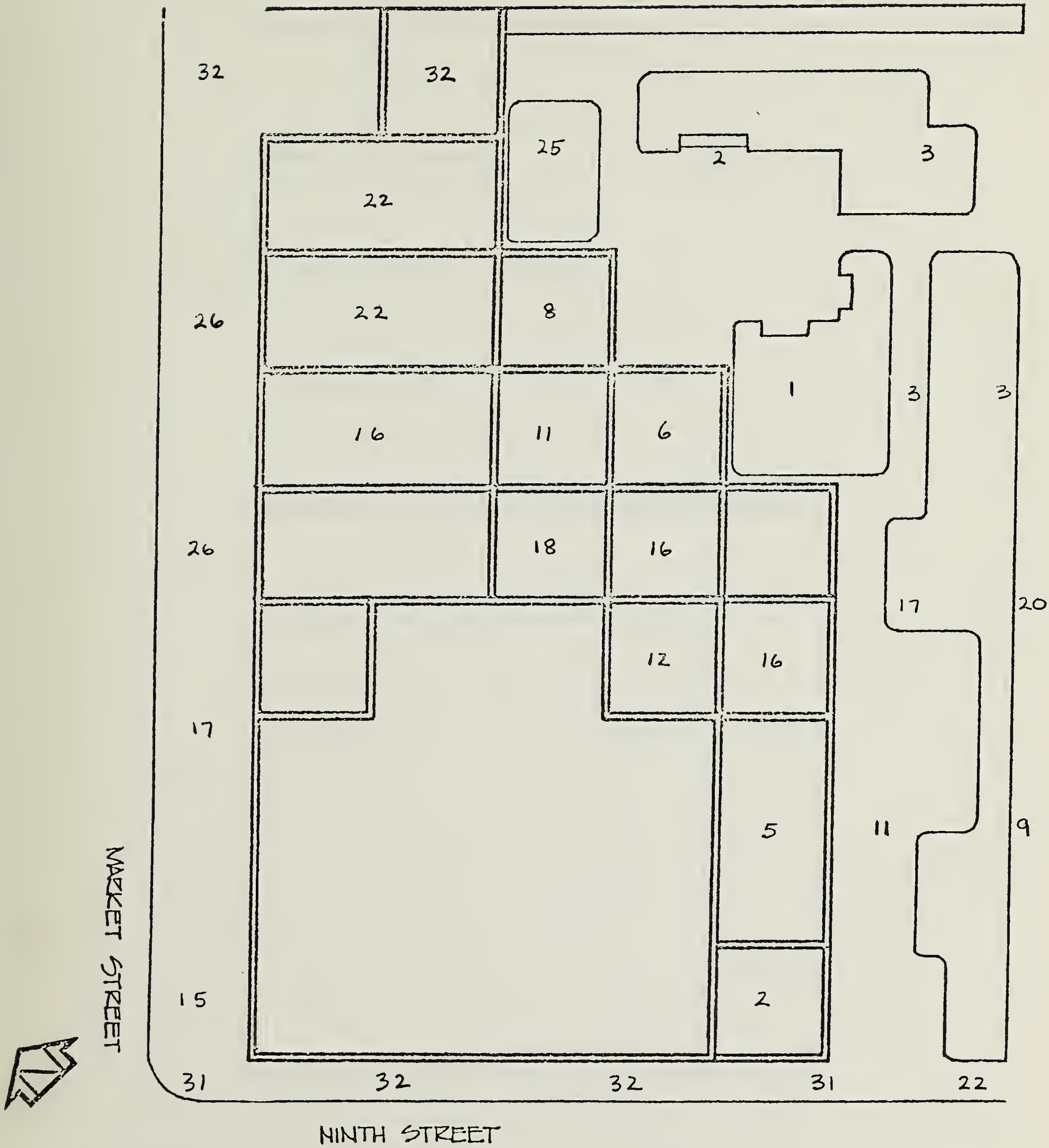


FIGURE 16 - Comfort Diagram for Winter, 1 P.M. Figures are percentage of time that discomfort will be experienced.

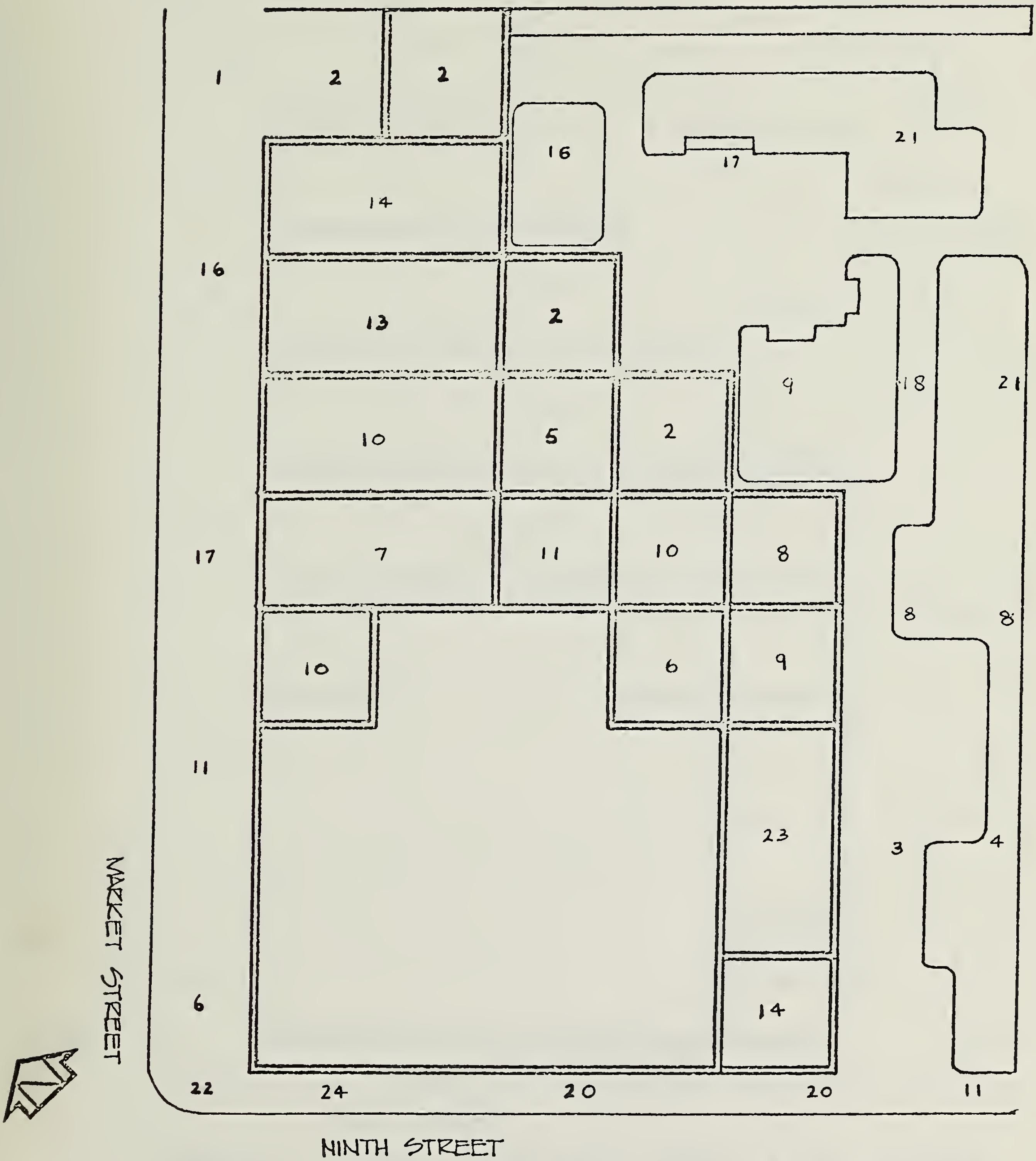


FIGURE 17 - Comfort Diagram for Winter, 5 P.M. Figures are percentage of time that discomfort will be experienced.

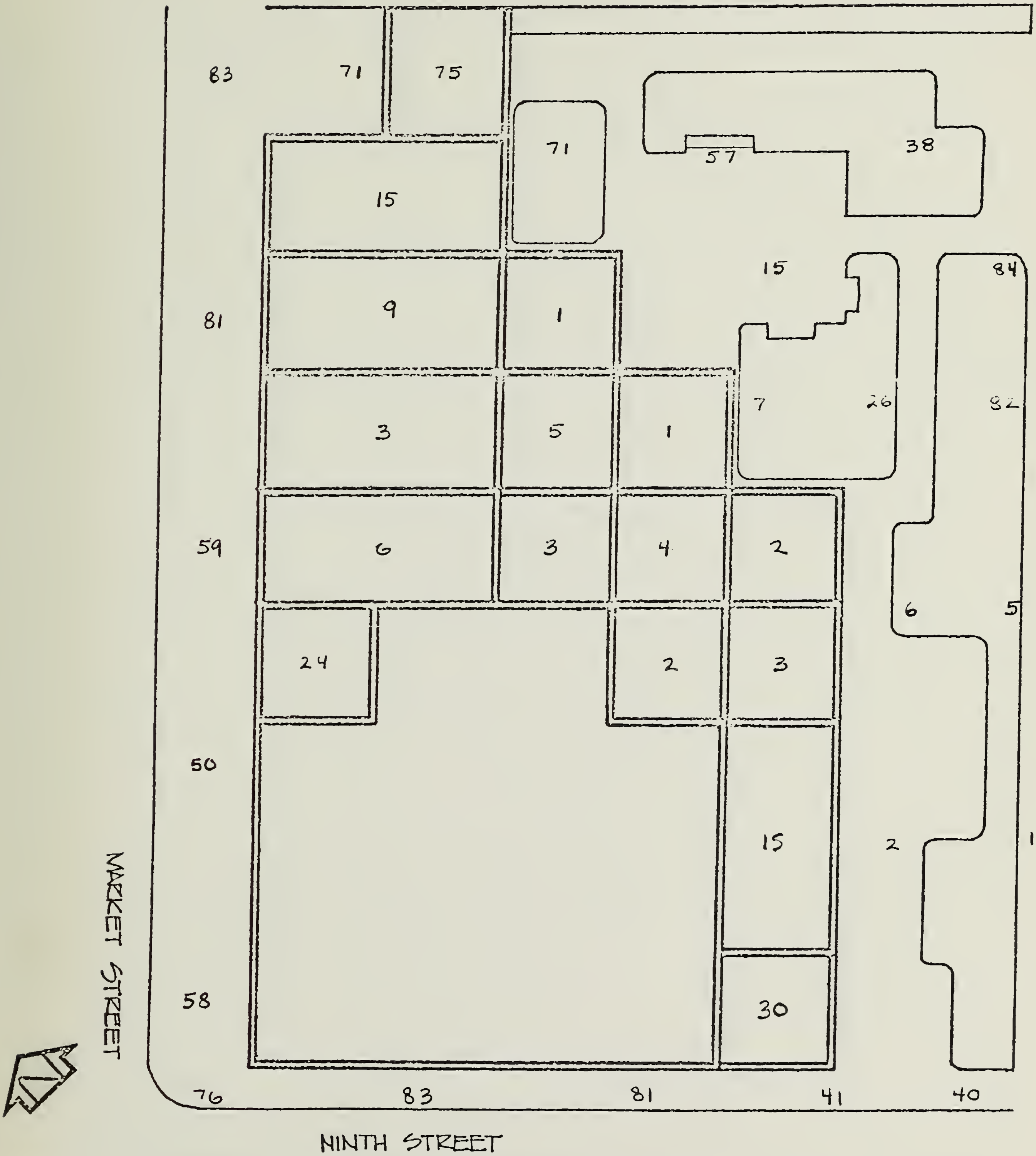


FIGURE 18 - Comfort Diagram for Summer, 9 A.M. Figures are percentage of time that discomfort will be experienced.

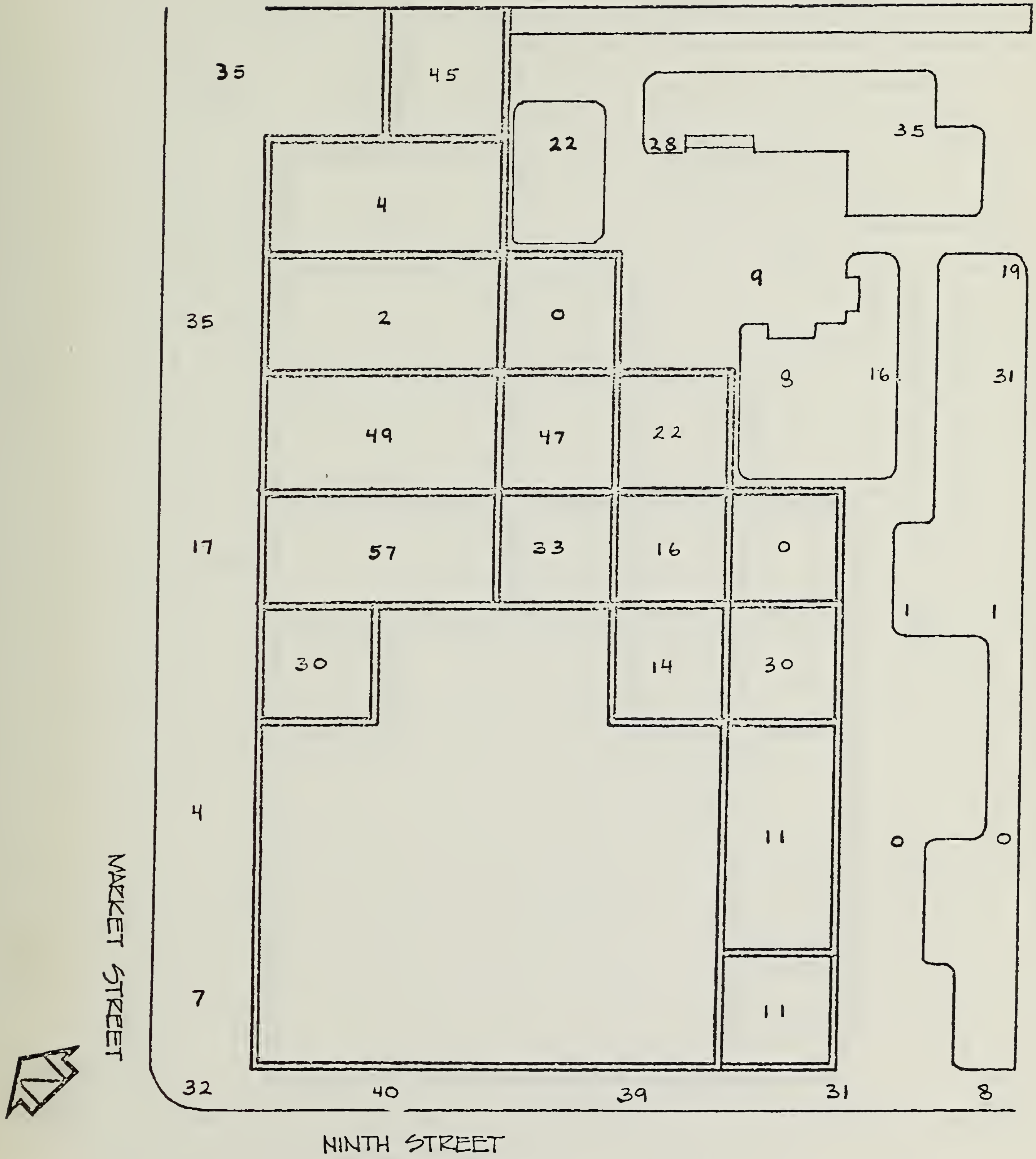


FIGURE 19 - Comfort Diagram for Summer, 1 P.M. Figures are percentage of time that discomfort will be experienced.

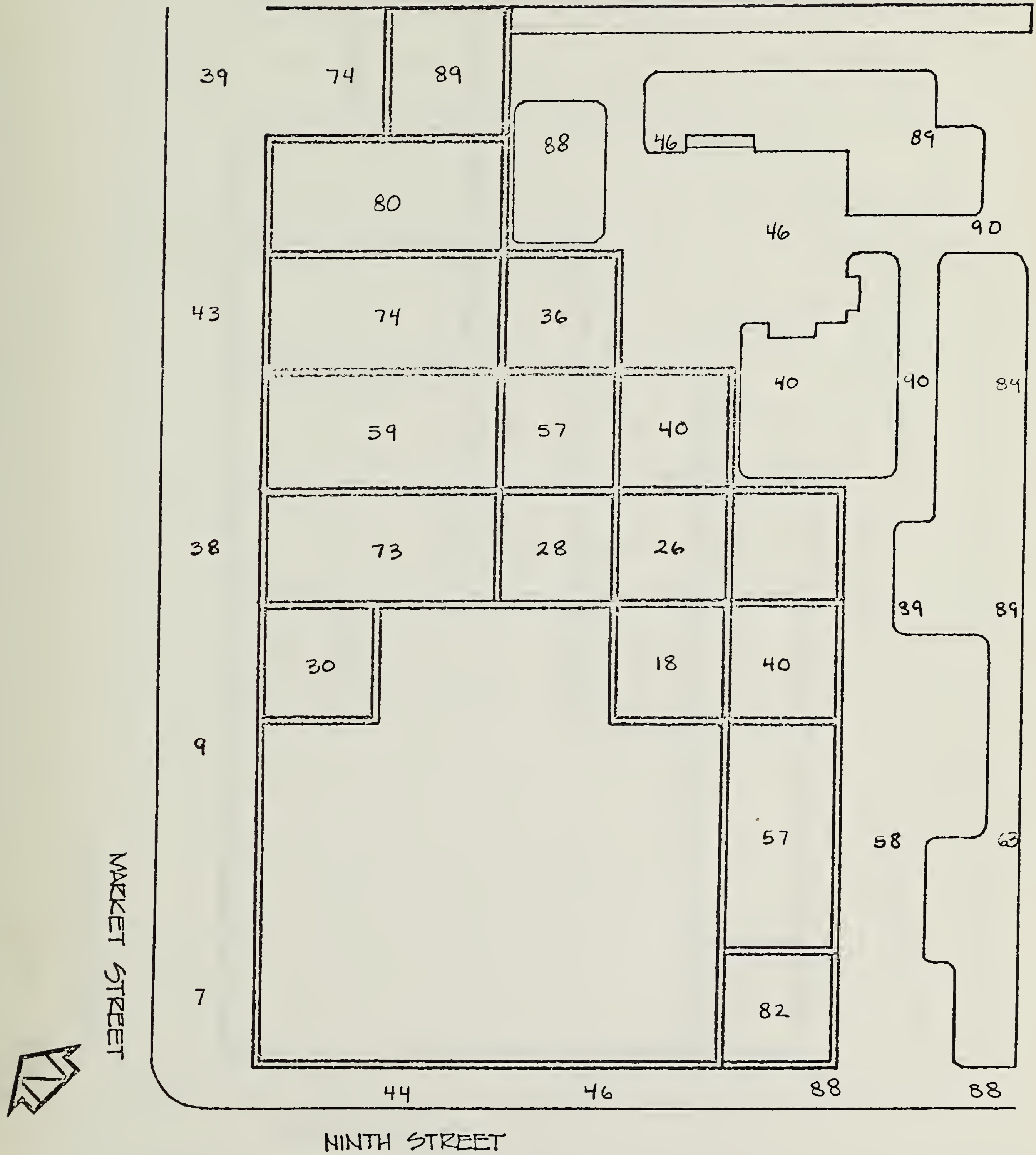


FIGURE 20 - Comfort Diagram for Summer, 5 P.M. Figures are percentage of time that discomfort will be experienced.

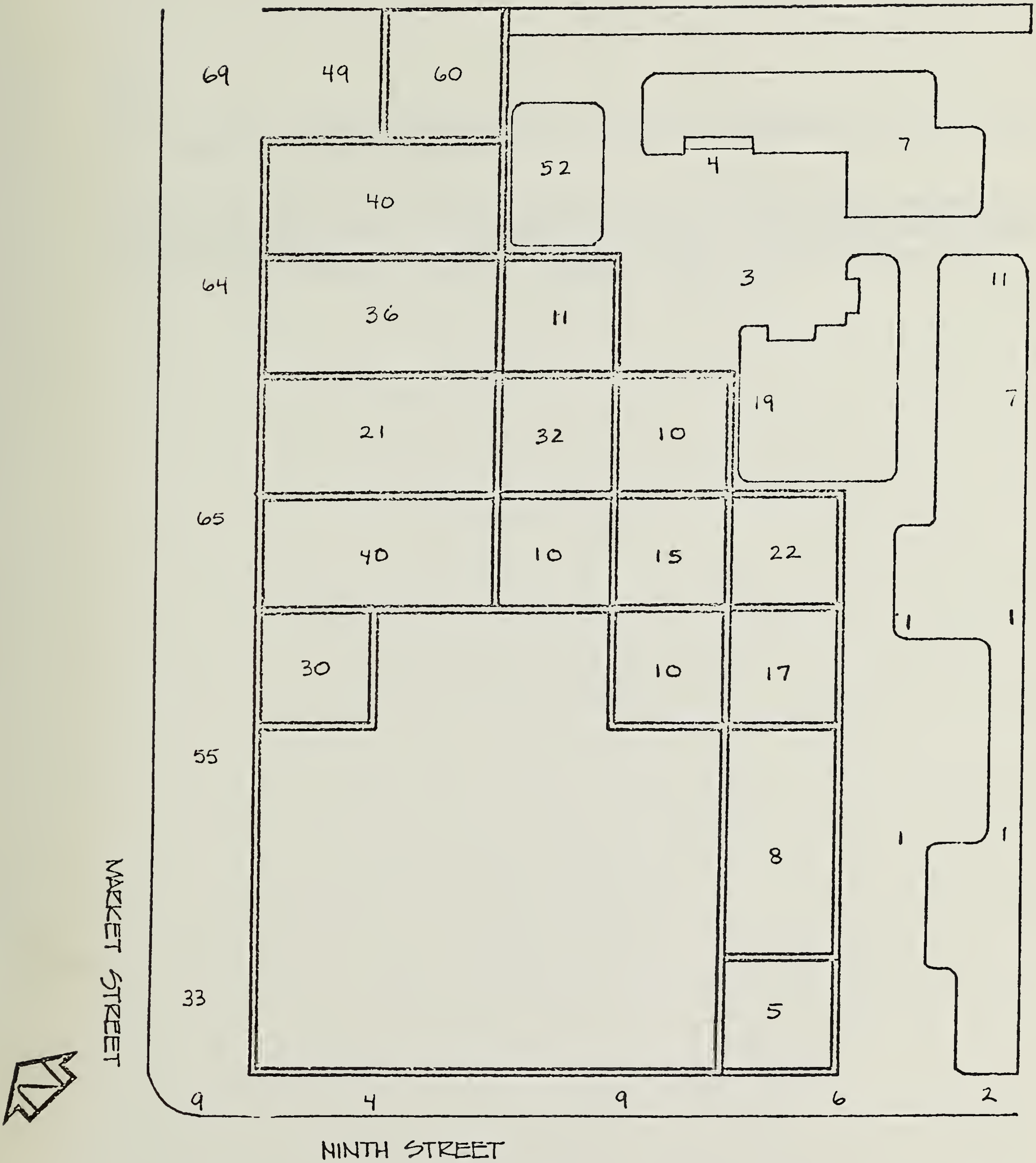


FIGURE 21 - Comfort Diagram for Spring, 1 P.M. Figures are percentage of time that discomfort will be experienced.

Fall

Fall in San Francisco generally brings a lessening of the wind and higher temperatures.

Figure 22 shows that afternoons in fall will bring comfortable conditions to most of the project site. Relatively high discomfort frequencies, however, will occur in the shaded area along Market Street and the windier terraces.

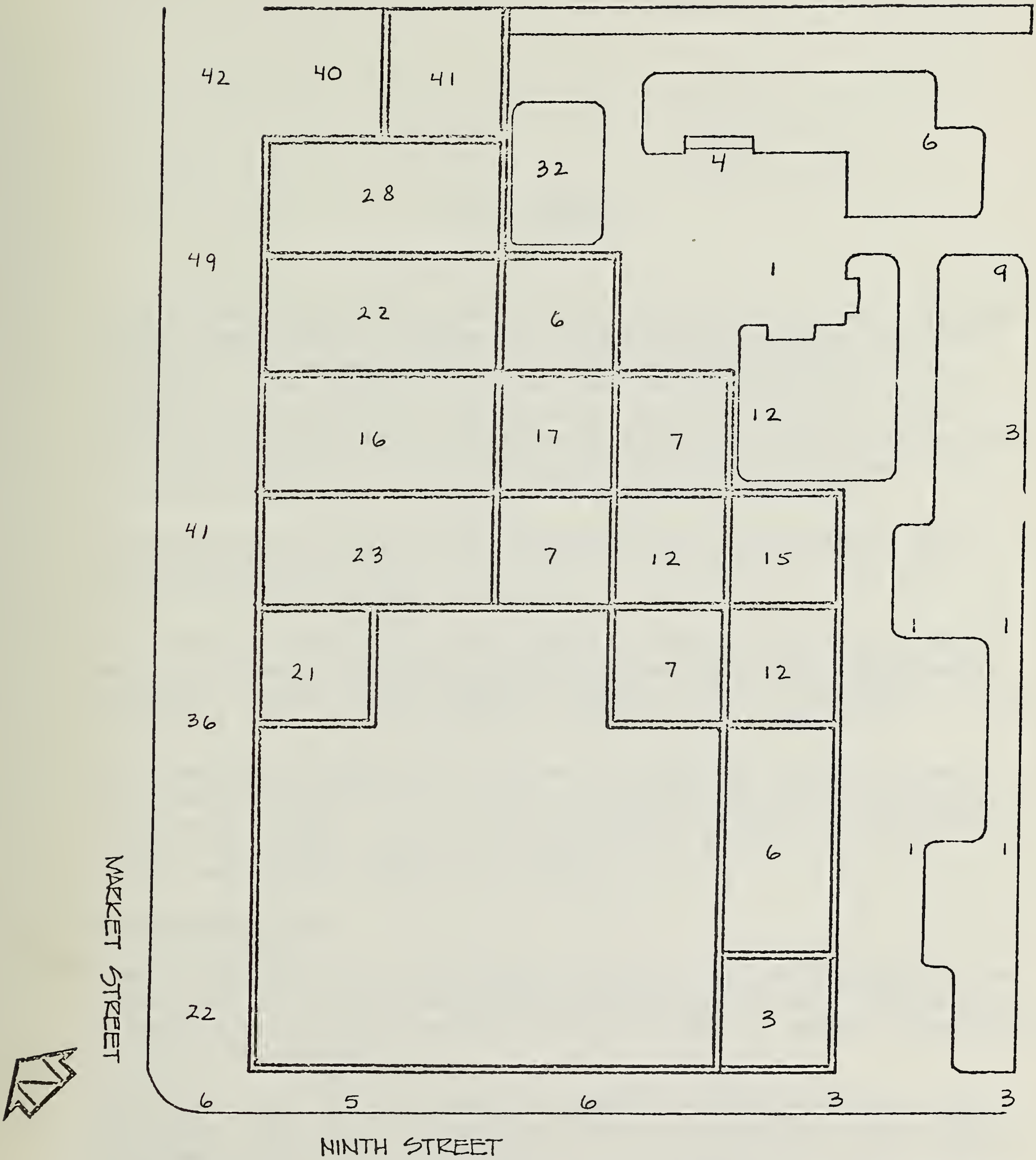


FIGURE 22 - Comfort Diagram for Fall, 1 P.M. Figures are percentage of time that discomfort will be experienced.

VII. SUMMARY

The research has shown that the construction of the proposed State Compensation Insurance Fund building should not have any major adverse effects on pedestrian convenience or comfort. The building appears to generally decrease windspeeds at ground level, providing areas of shelter which are not now available. The areas of high wind found near the building appear to be of the same magnitude and extent of similar areas found without the proposed structure.

The plaza and terraces are generally well sheltered, with the exception of the bridge and the terraces on the west side of the building.

The comfort analysis shows that the least comfortable season will be summer, when cool temperatures and high windspeeds prevail. Even during summer, however, the plaza east of the building will be comfortable a good deal of the time.

The comfort analysis also shows the area of Market Street adjacent to the building will be generally less comfortable than other areas. A notable exception is the area near the corner of Market Street and 9th, which generally has low winds and a high degree of comfort.

Recommendations

The relatively high windspeeds measured on the bridge at the north end of the project suggest that some form of protection from the wind may be needed on the bridge to assure reasonable comfort and safety.

Both the wind analysis and the comfort analysis reveal that the area of Market Street near 9th Street will be generally pleasant under most conditions. It is suggested that pedestrian traffic be focused here by placing any benches, bus stops or trash receptacles in this area.

Design modifications to lessen winds along Market Street would have to be developed in further research in the wind tunnel. Some additional local shelter could be provided by use of trees or bushes to dissipate the wind. Providing bus shelters would allow pedestrian refuge from rainy and windy conditions.

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APPENDIX D

EE 74.71

SUN - SHADOW STUDY

HELIOLUX
1000 Sansome Street
San Francisco, California 94111

April 1974

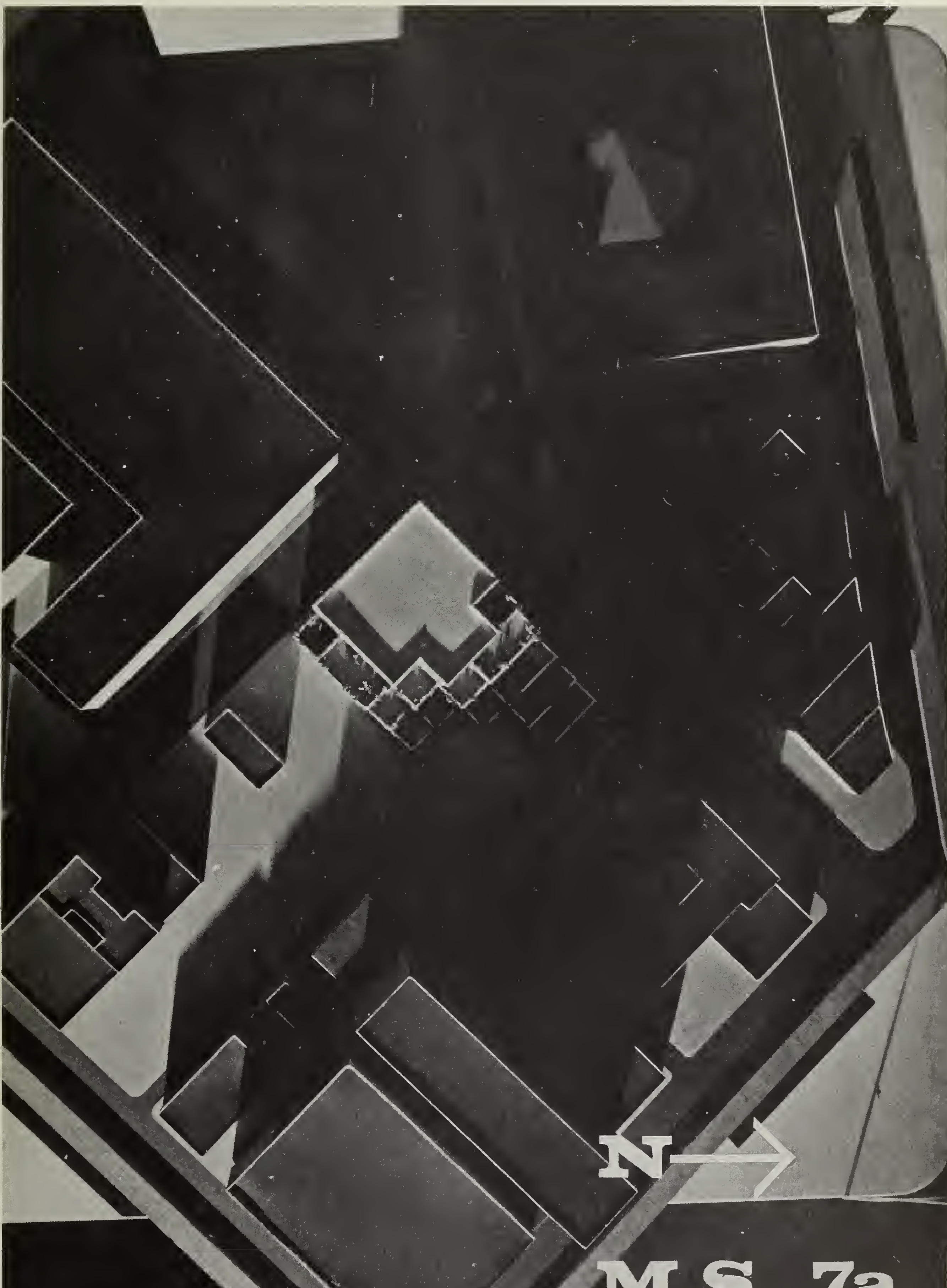
APPENDIX D

SUN - SHADOW STUDY

PHOTOGRAPH INDEX

TIME	MARCH 21 AND SEPTEMBER 21	JUNE 21	DECEMBER 21
6:00 AM	------------	J 6a (103)*	-----------
7:00 AM	M-S 7a (92)*	J 7a (104)	-----------
8:00 AM	M-S 8a (93)	J 8a (105)	D 8a (115)*
9:00 AM	M-S 9a (94)	J 9a (106)	D 9a (116)
10:00 AM	M-S 10a (95)	J 10a (107)	D 10a (117)
11:00 AM	M-S 11a (96)	J 11a (108)	D 11a (118)
12:00 M	M-S 12 (97)	J 12 (109)	D 12 (119)
1:00 PM	M-S 1p (98)	J 1p (110)	D 1p (120)
2:00 PM	M-S 2p (99)	J 2p (111)	D 2p (121)
3:00 PM	M-S 3p (100)	J 3p (112)	D 3p (122)
4:00 PM	M-S 4p (101)	J 4p (113)	-----------
5:00 PM	M-S 5p (102)	J 5p (114)	-----------

* Page numbers are shown in parentheses.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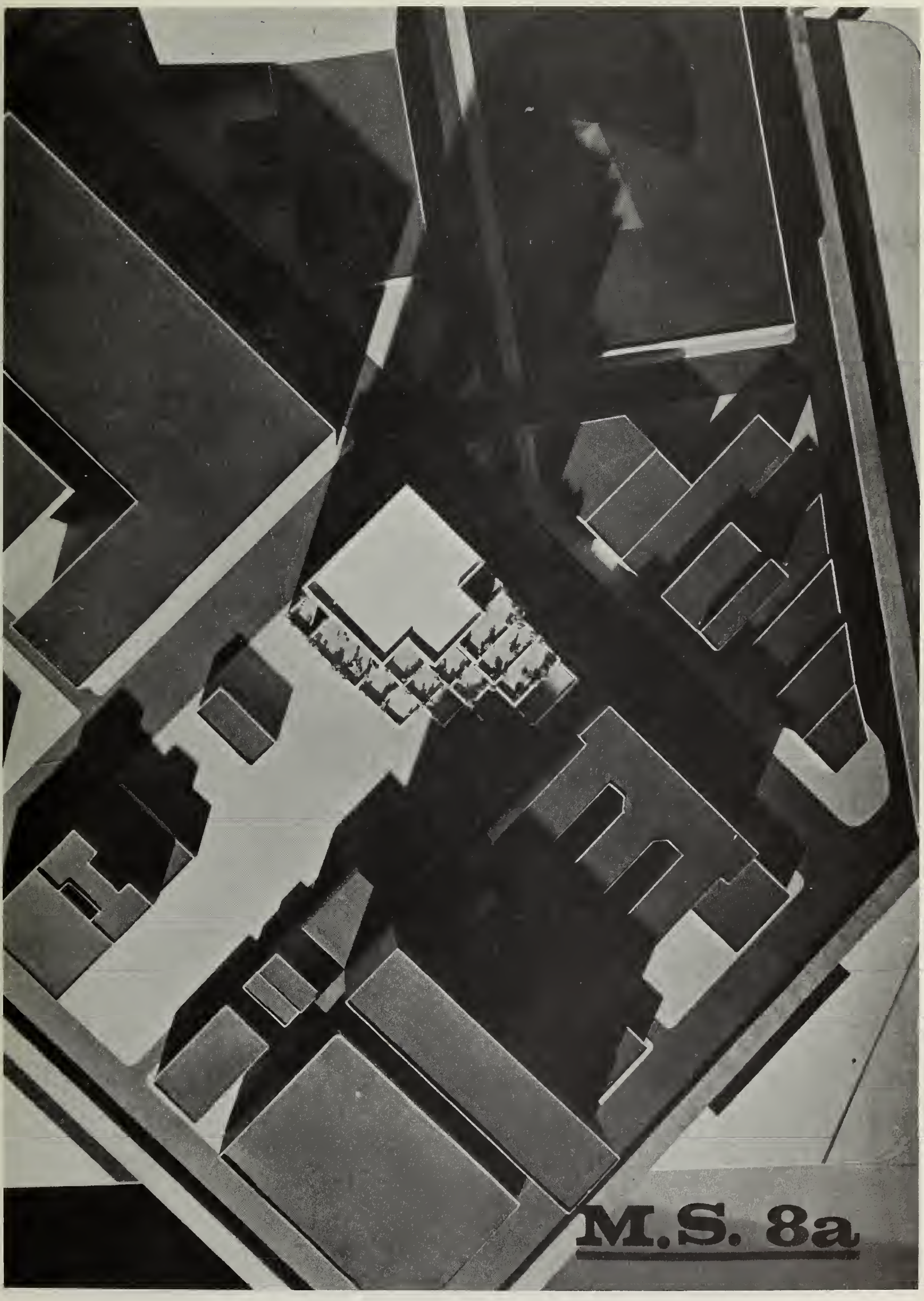
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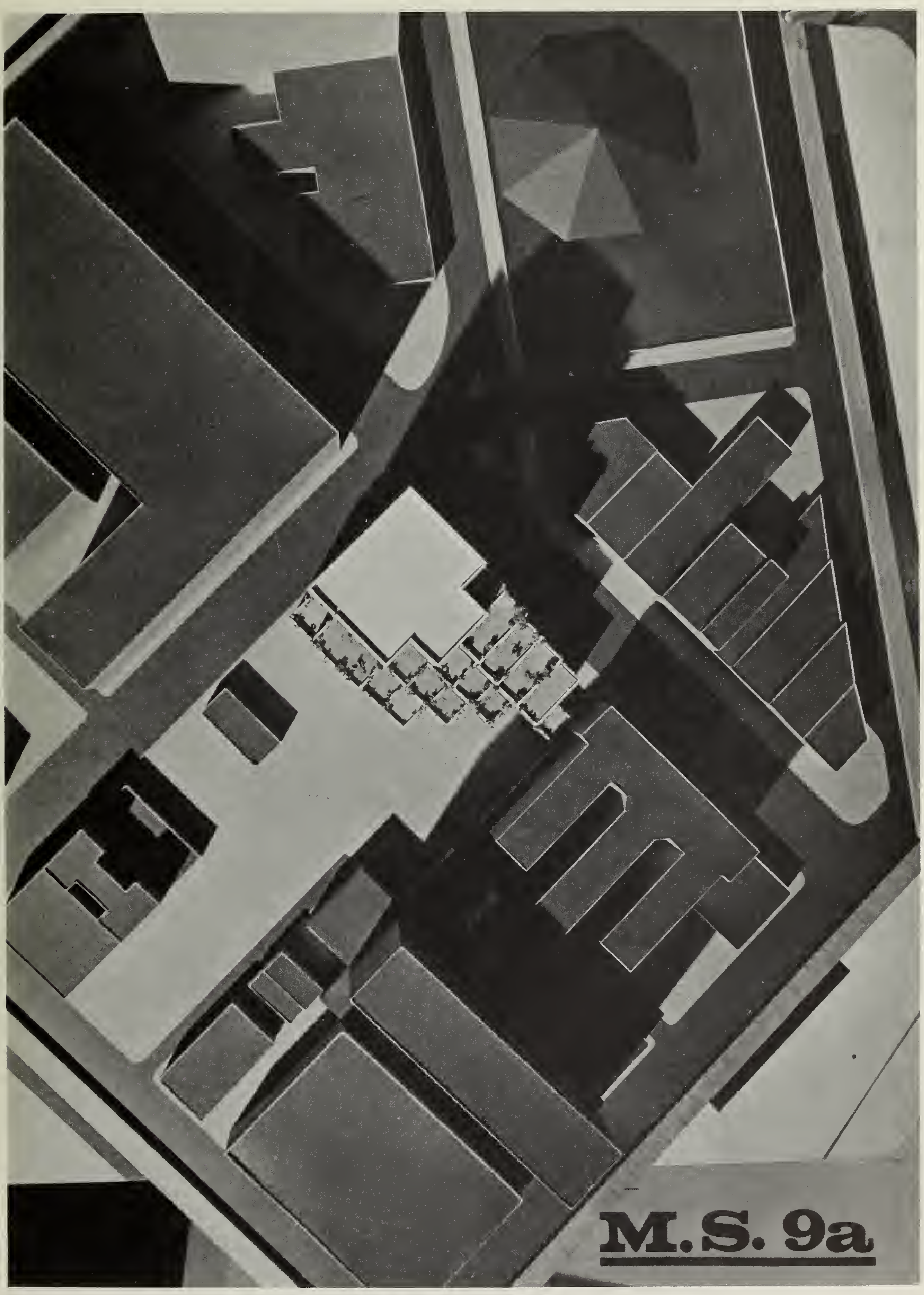
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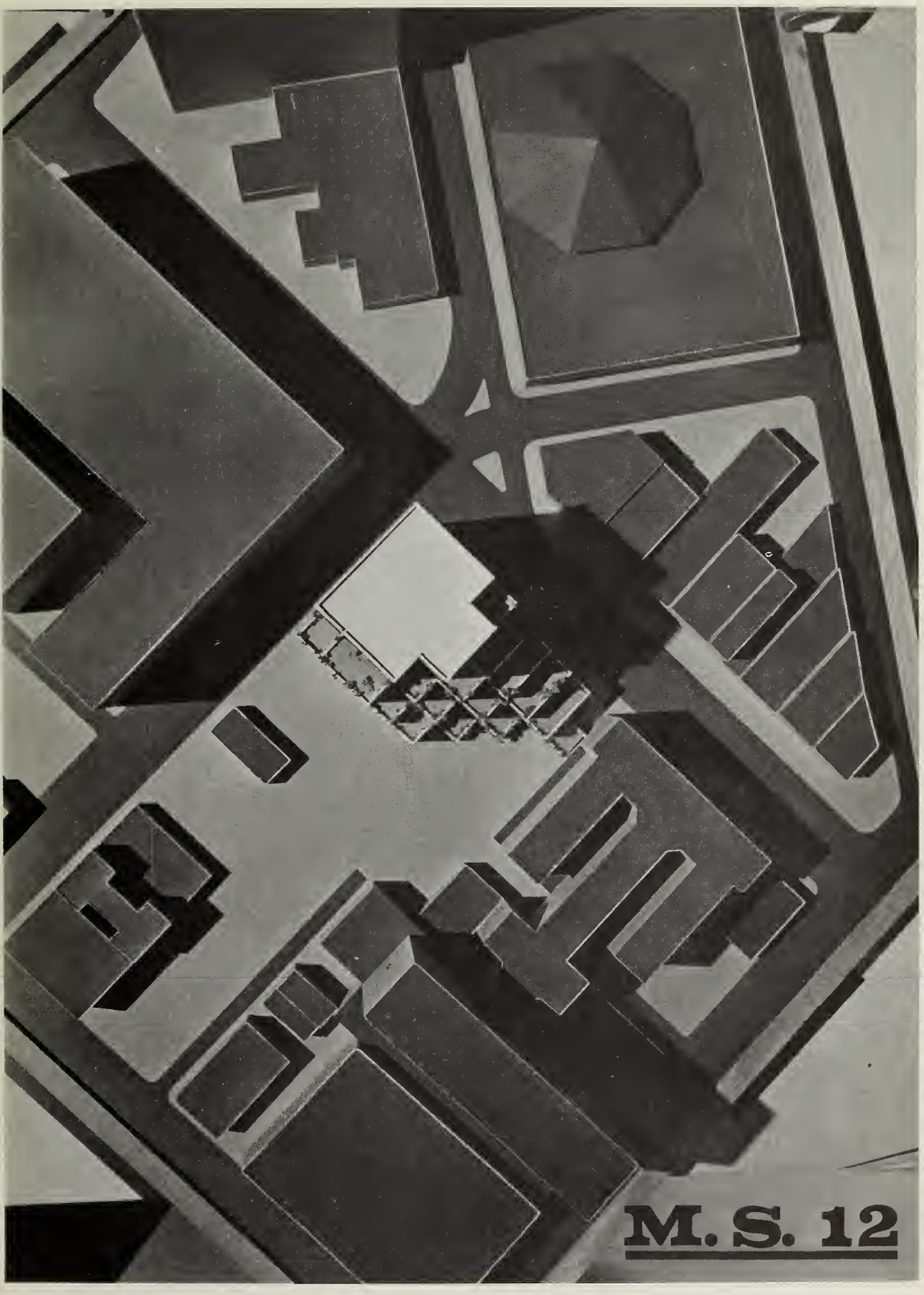
M.S. 10a


M.S. 11a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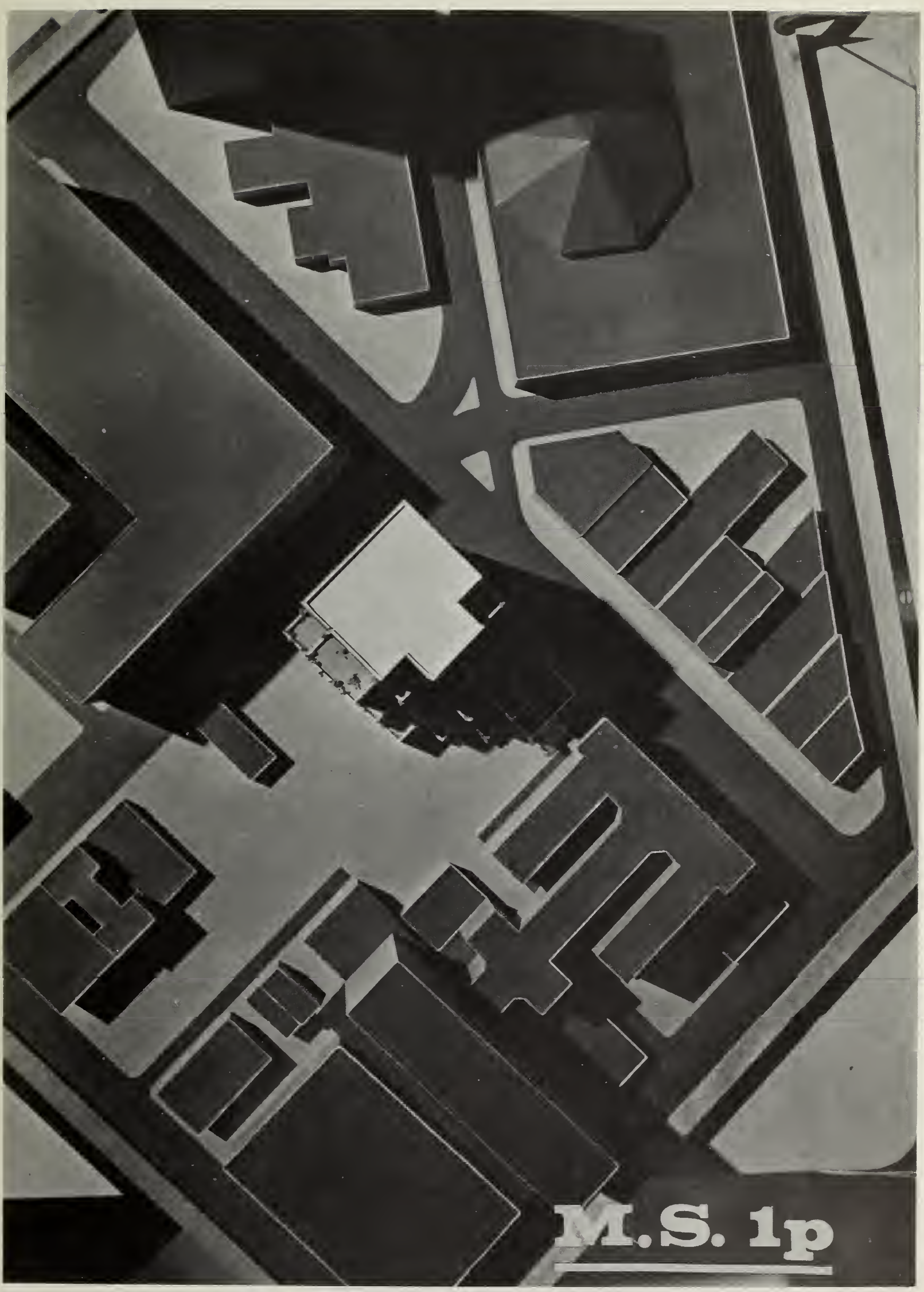
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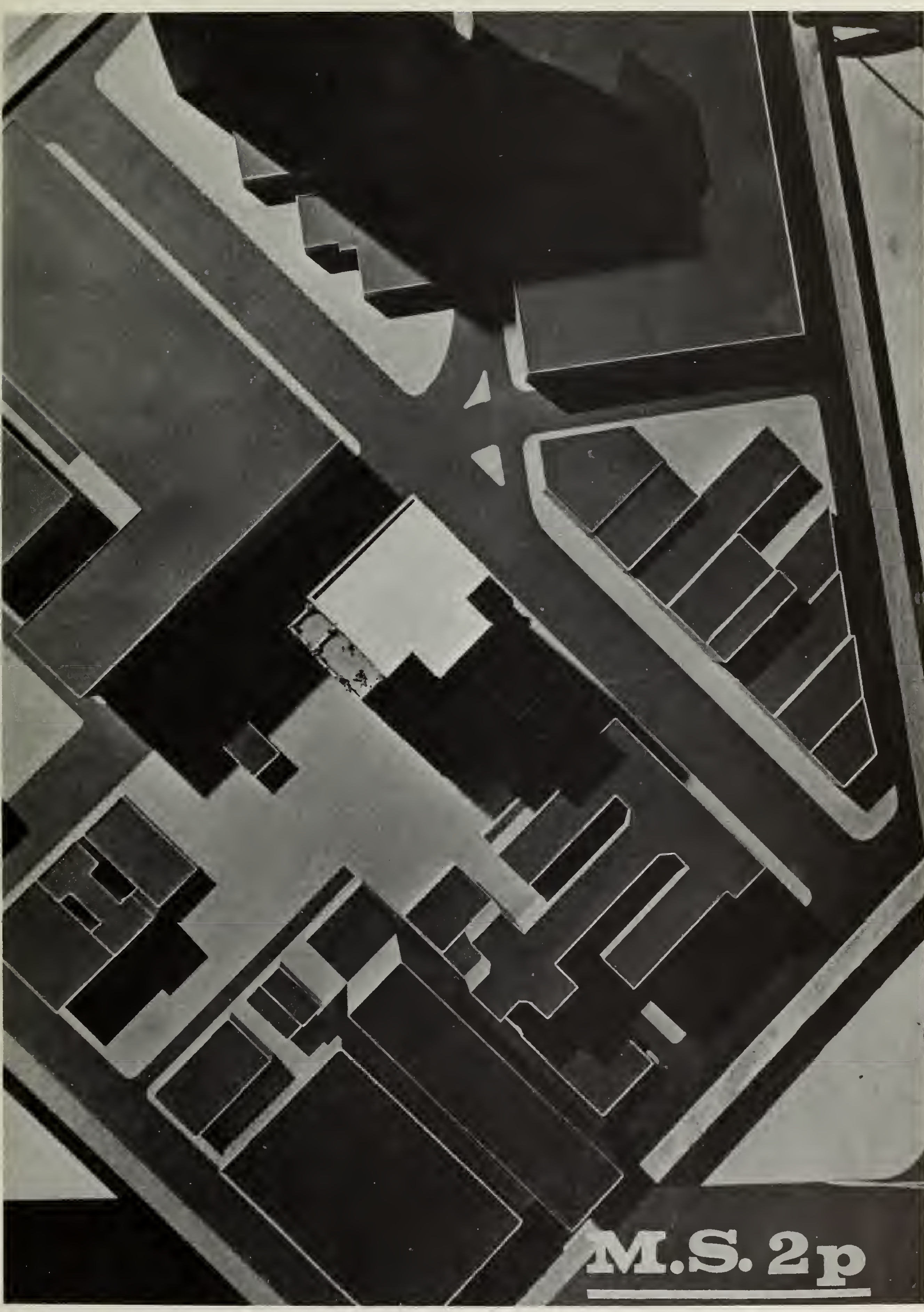
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M. S. 3p


M.S. 4p


M.S. 5p


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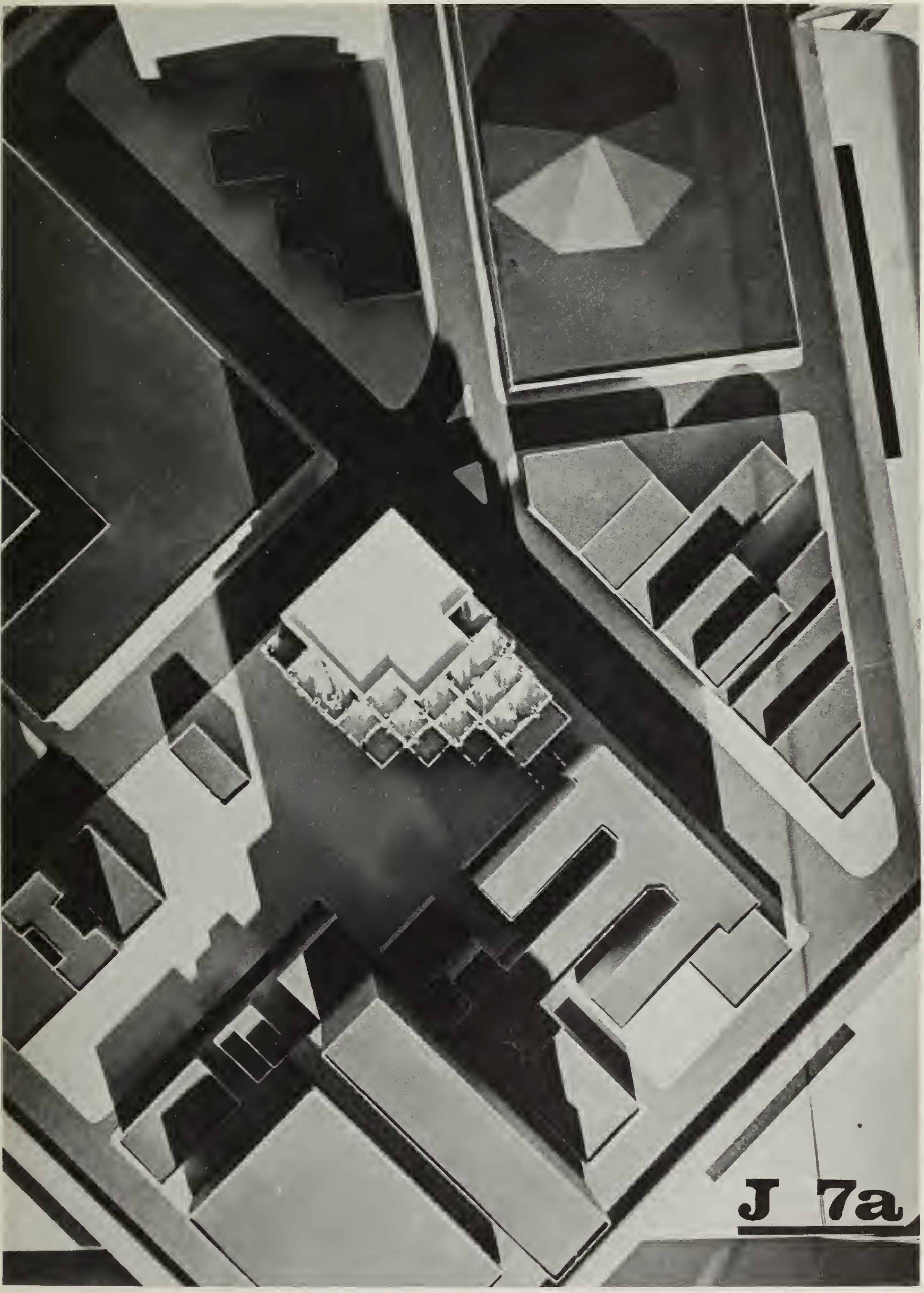
J 6a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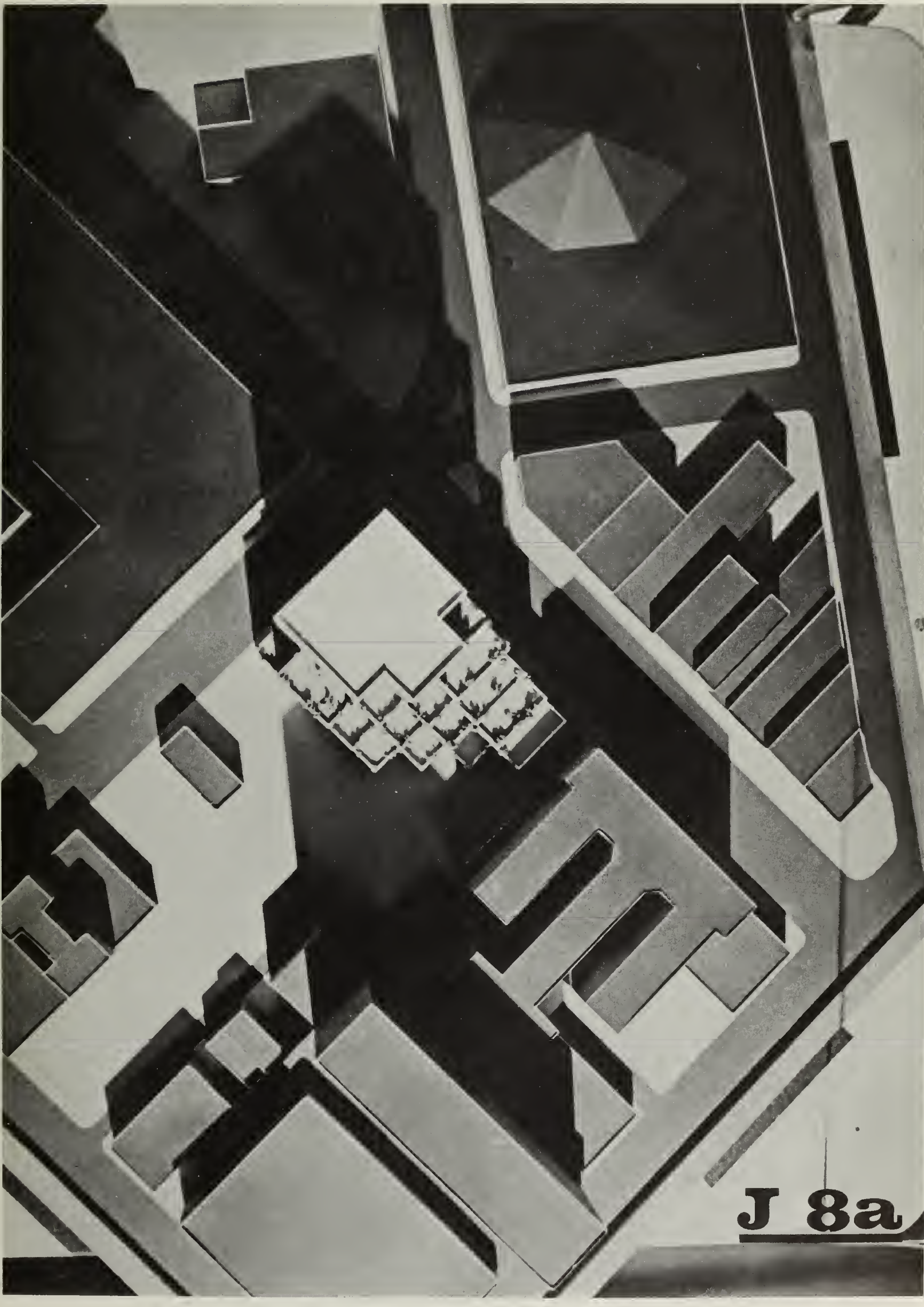
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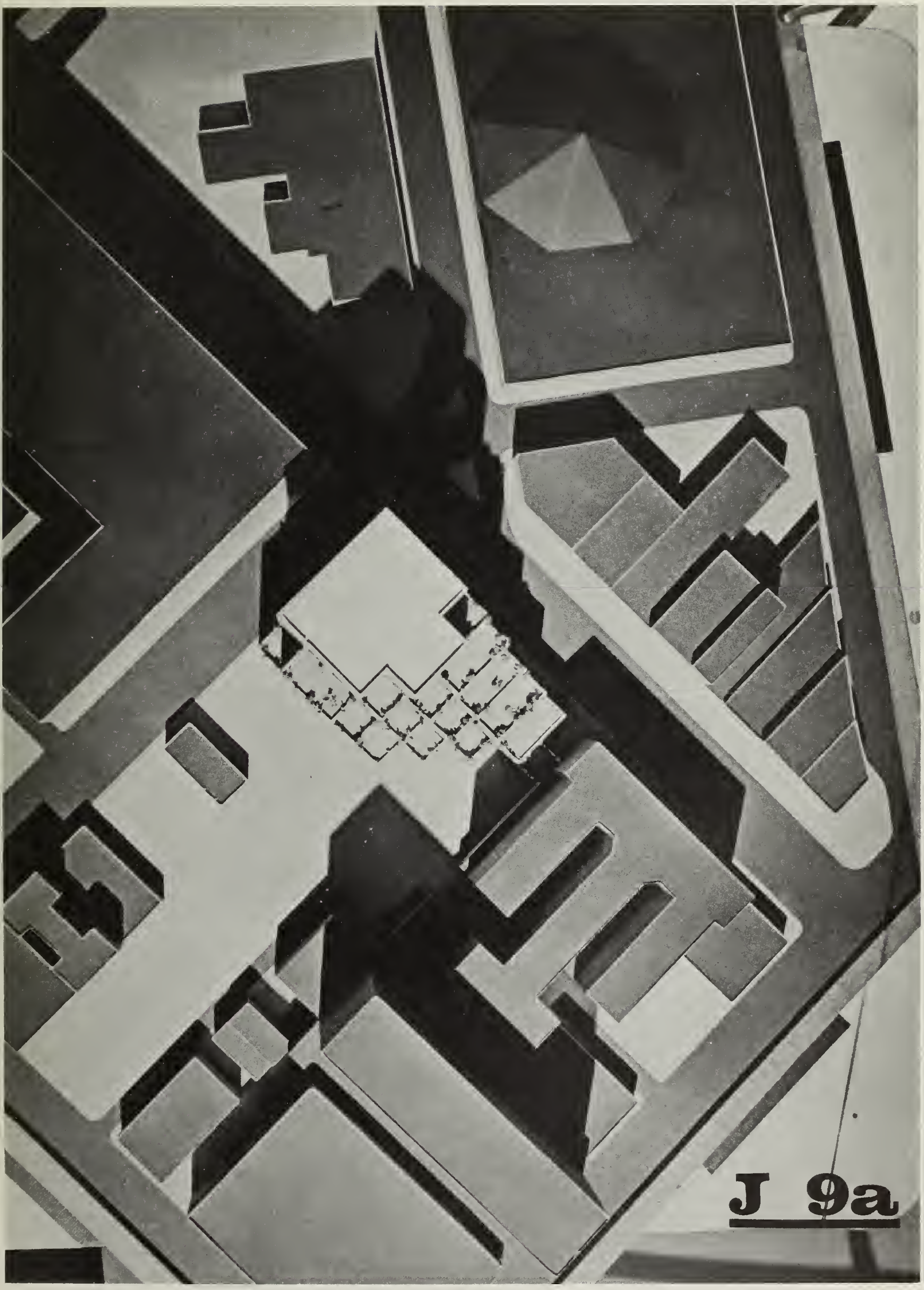
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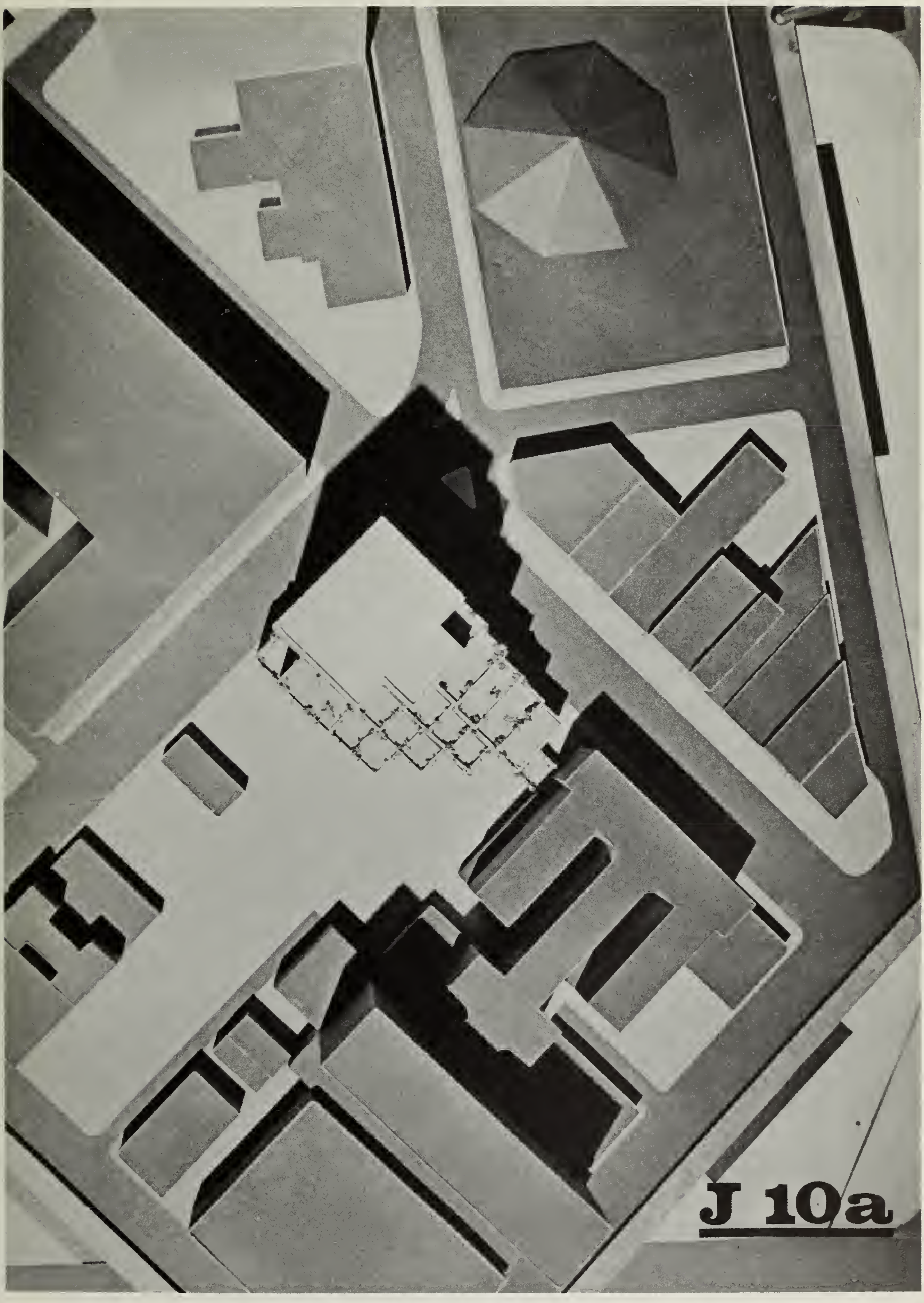
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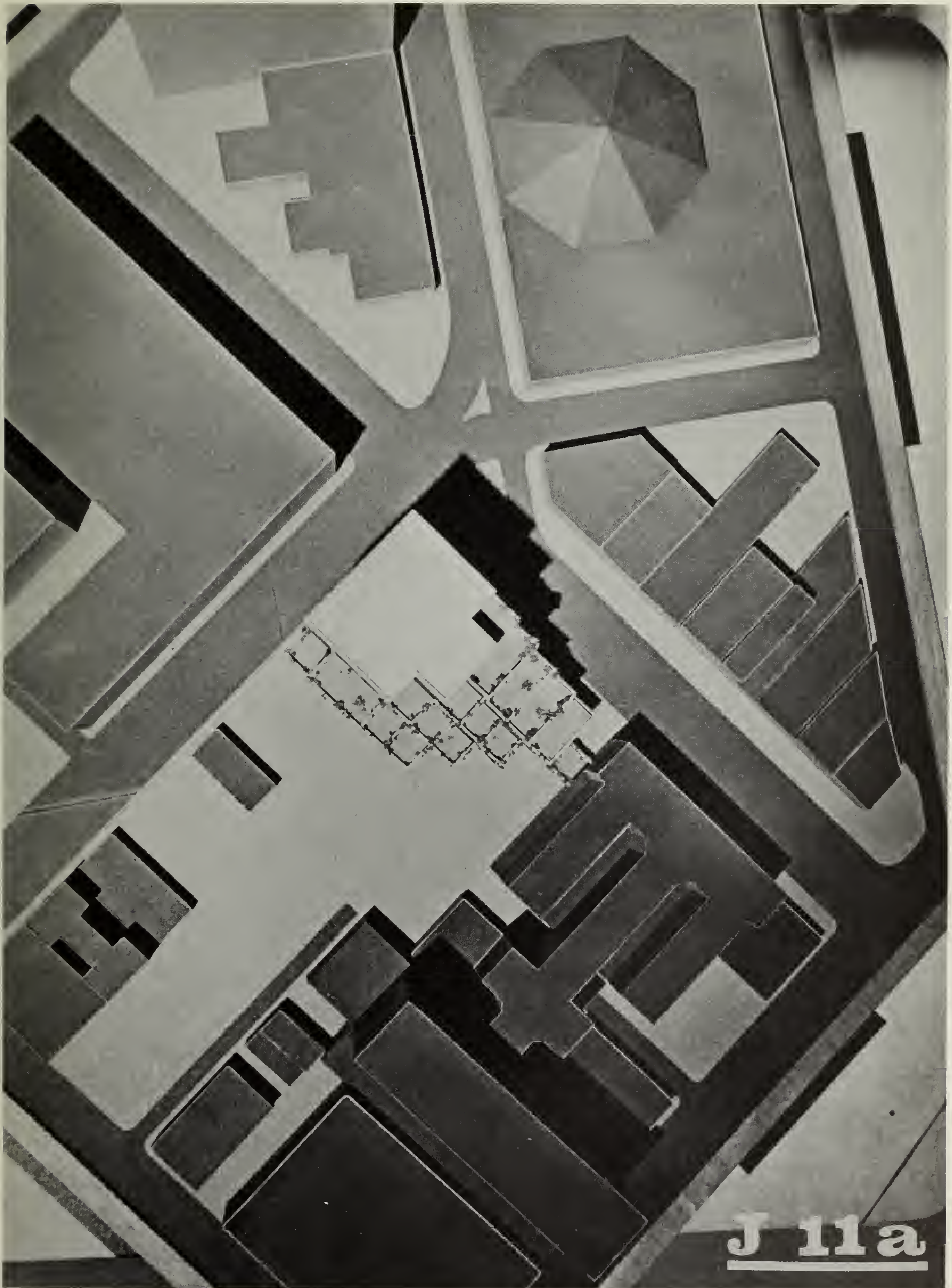
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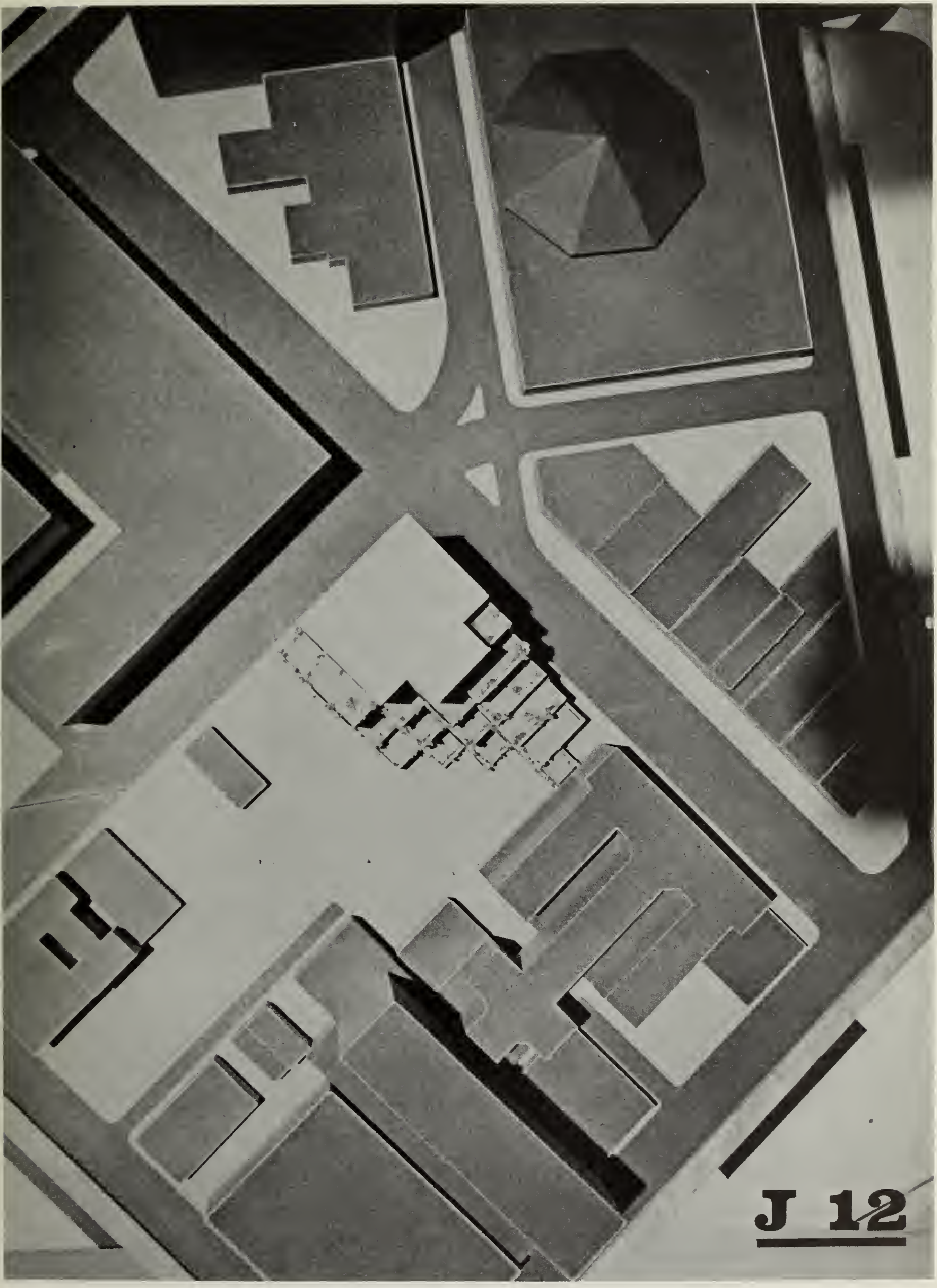
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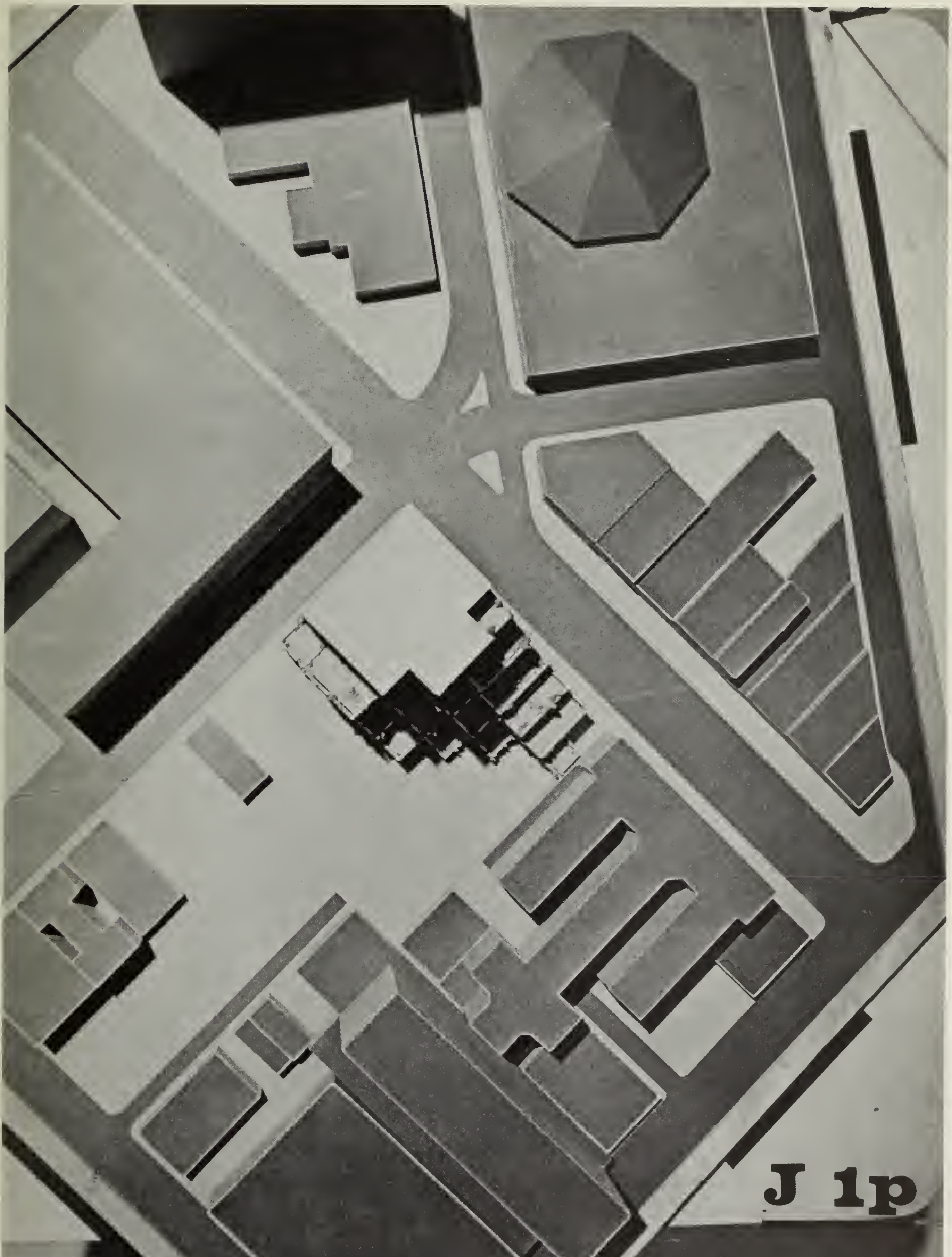
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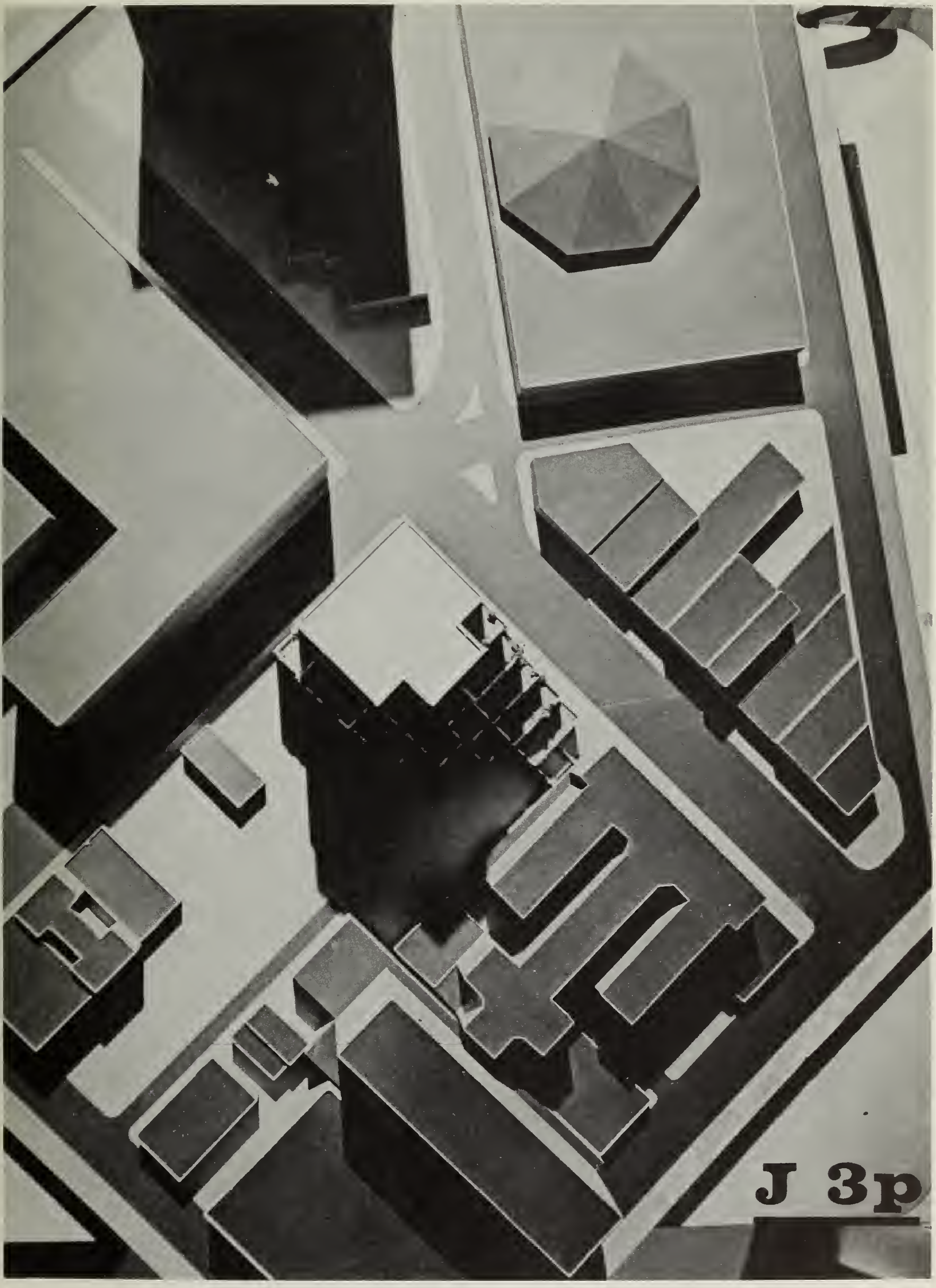
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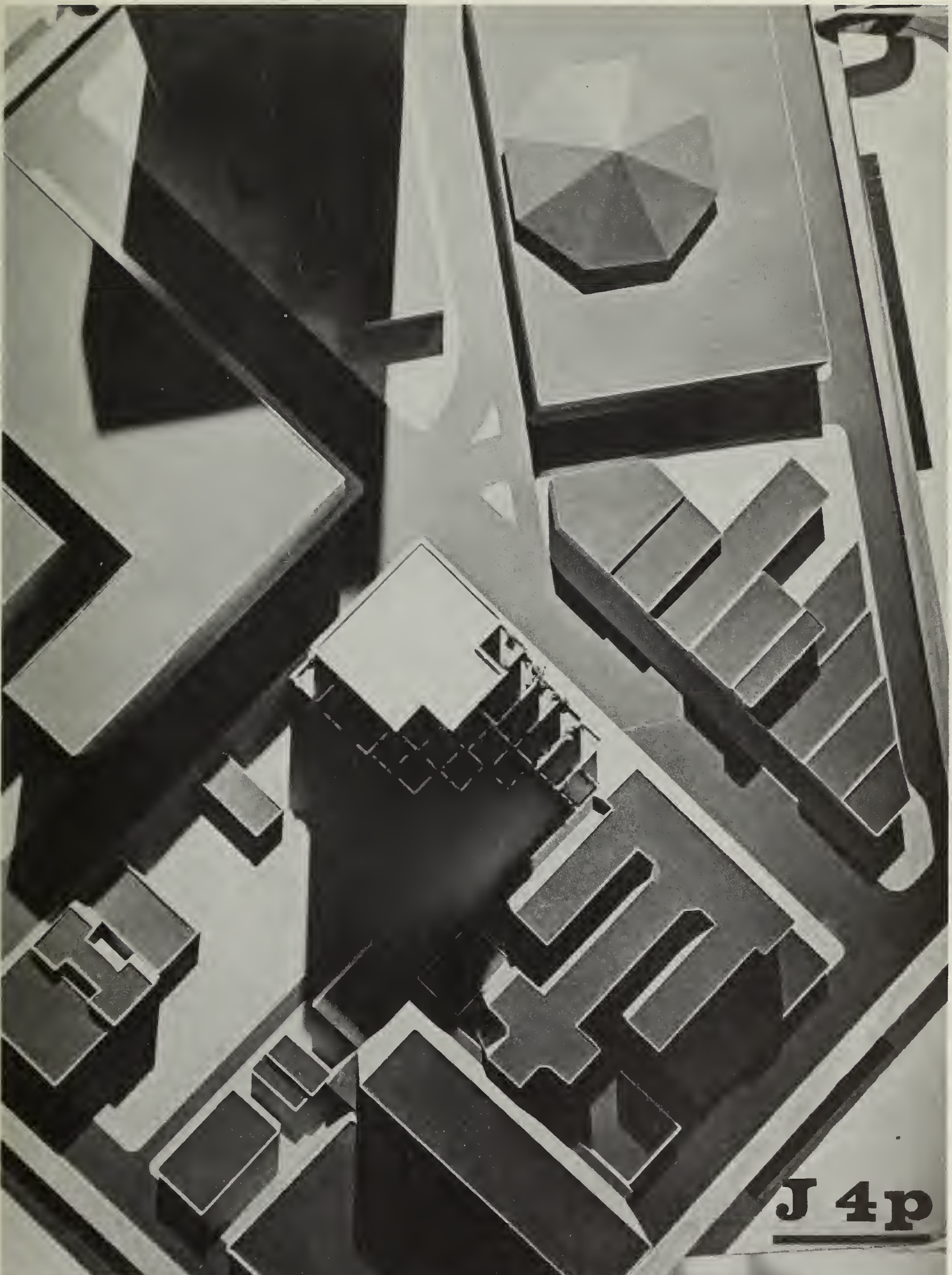
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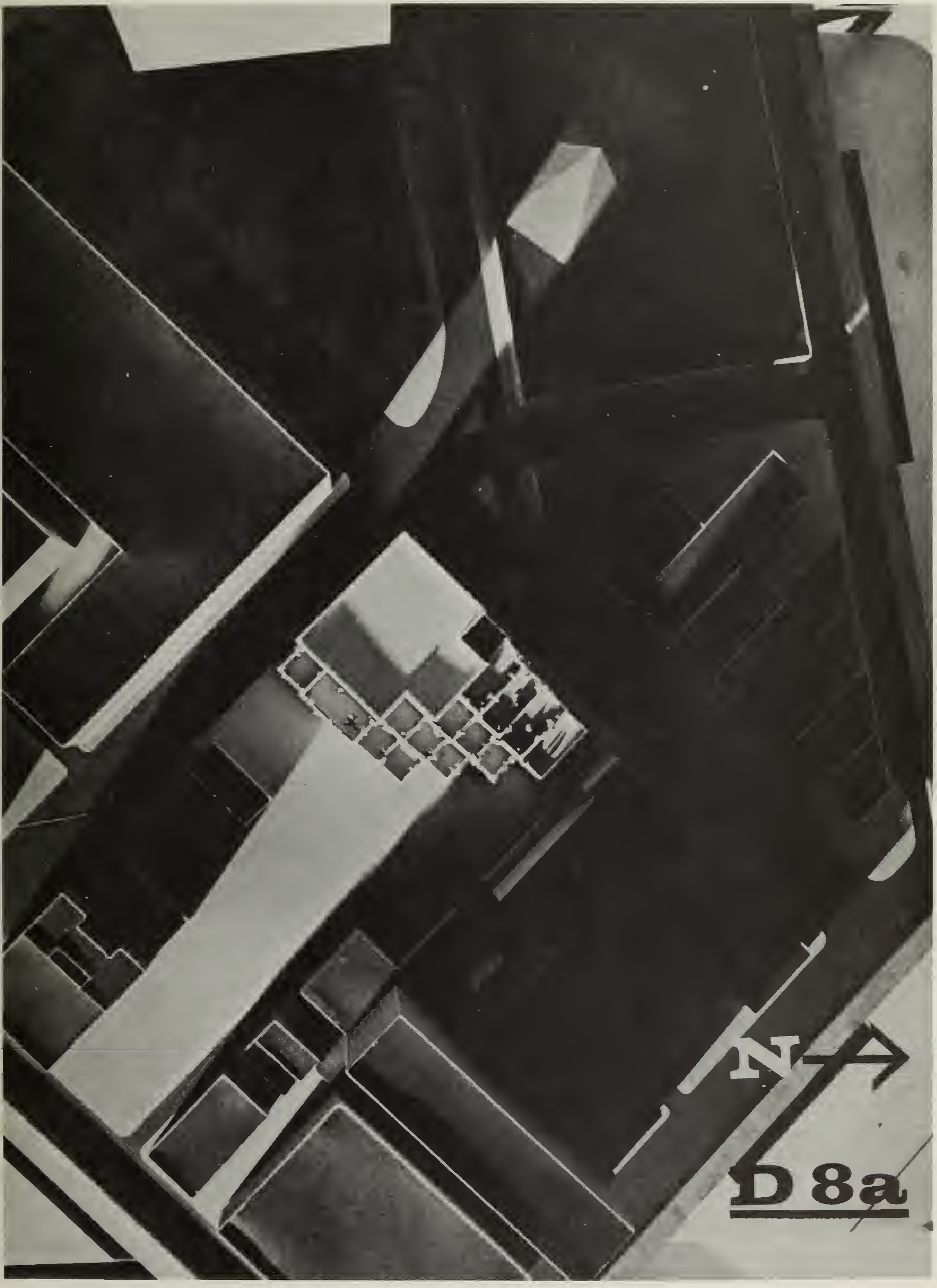
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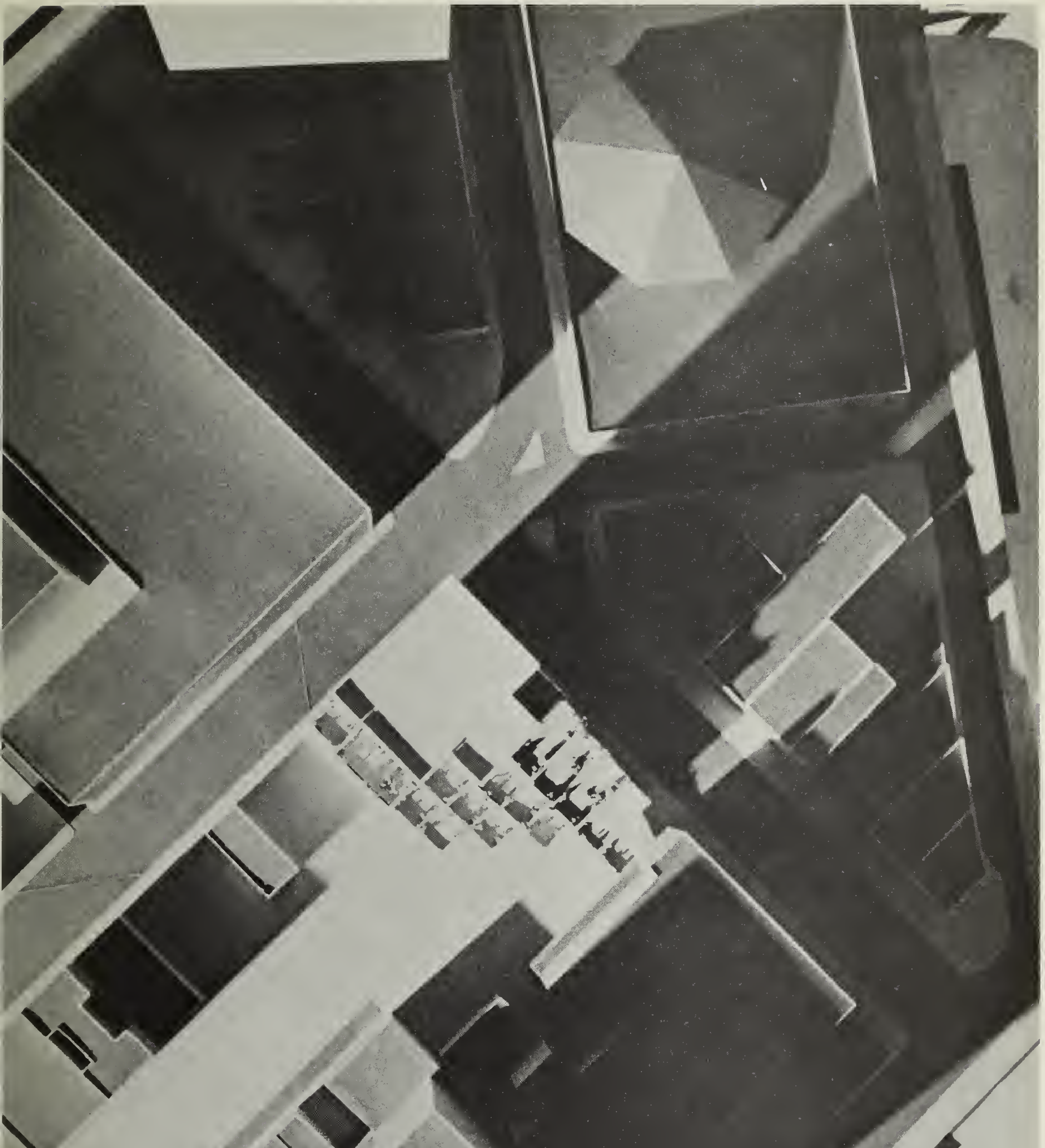
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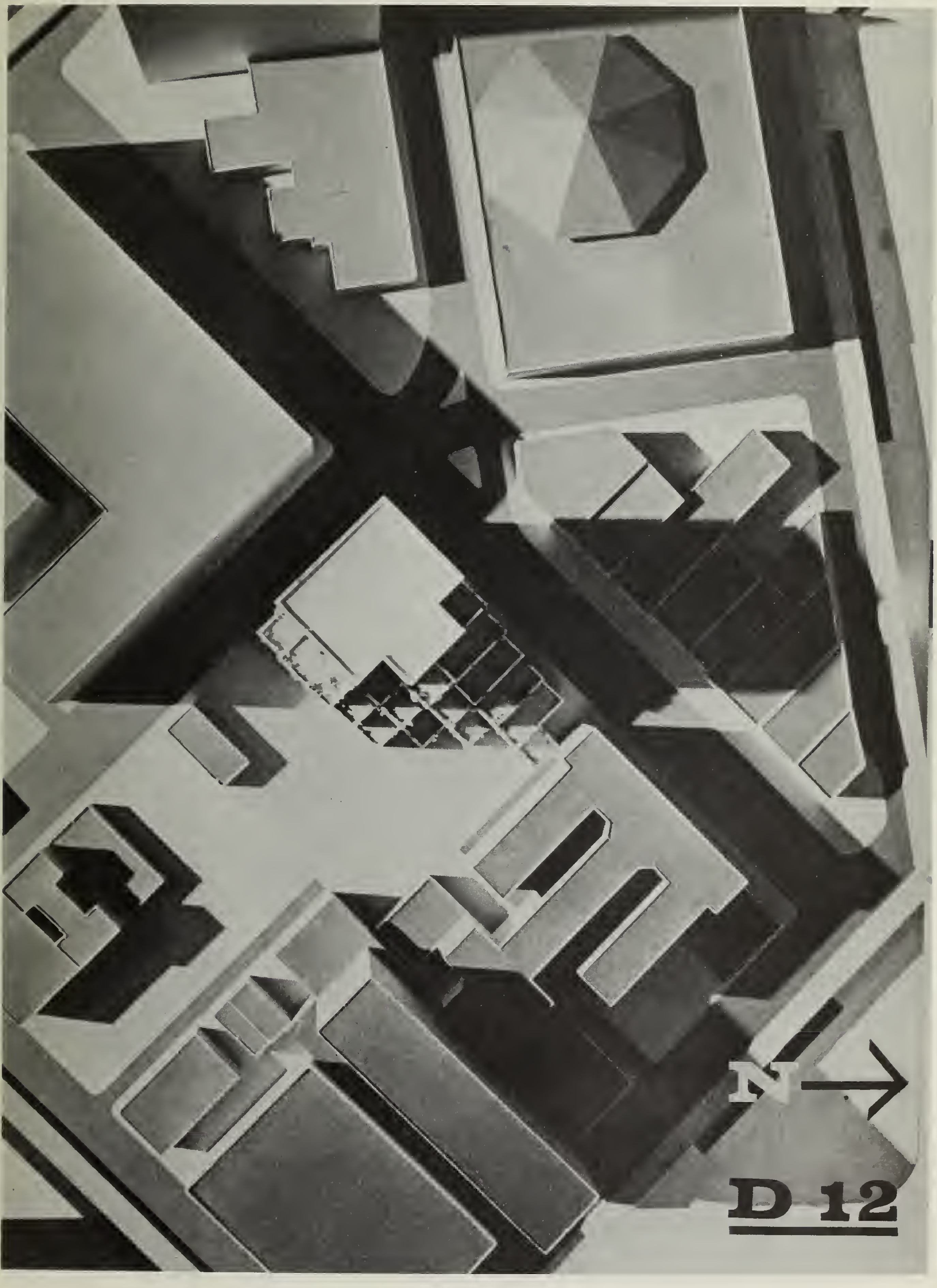
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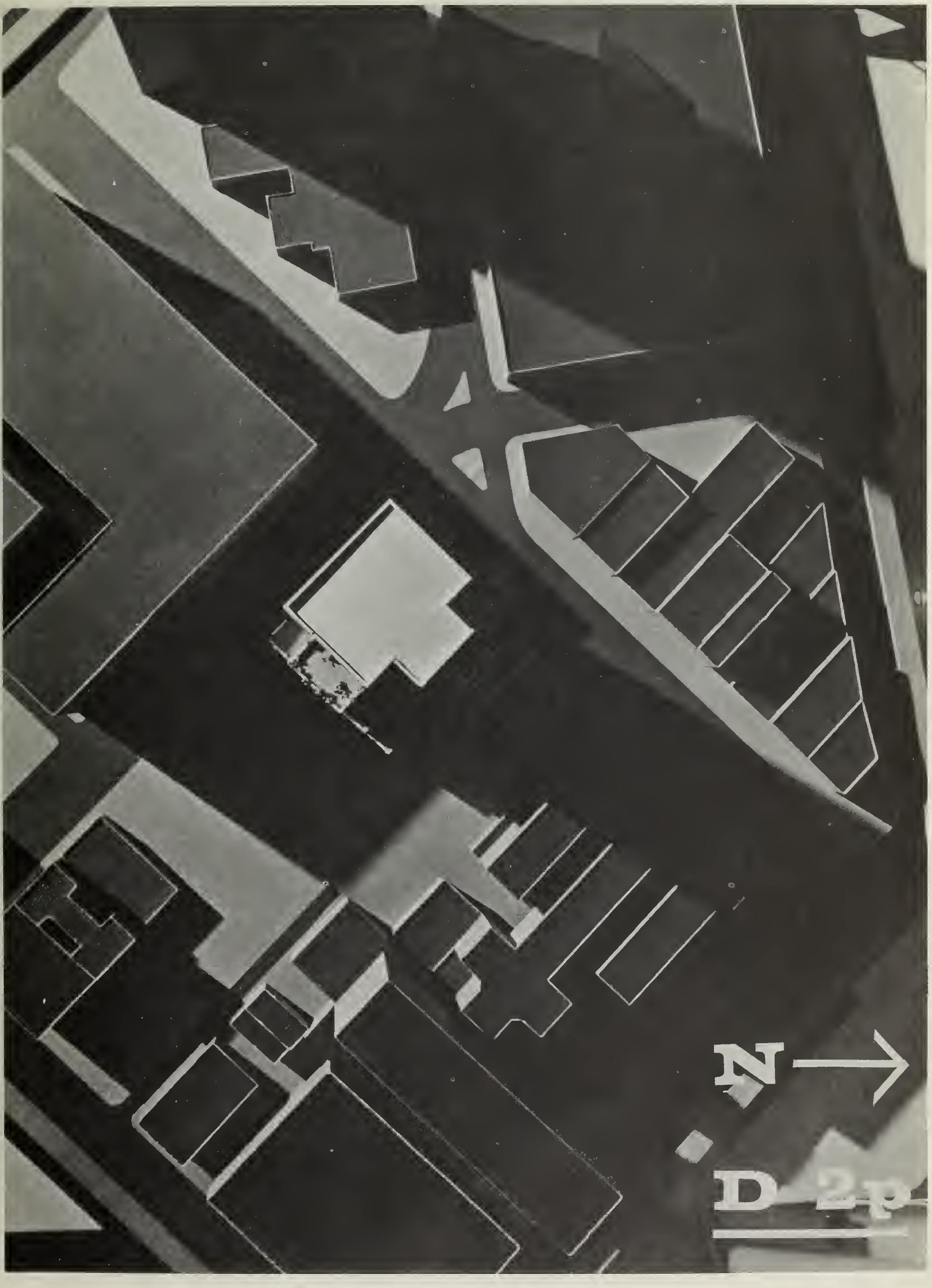
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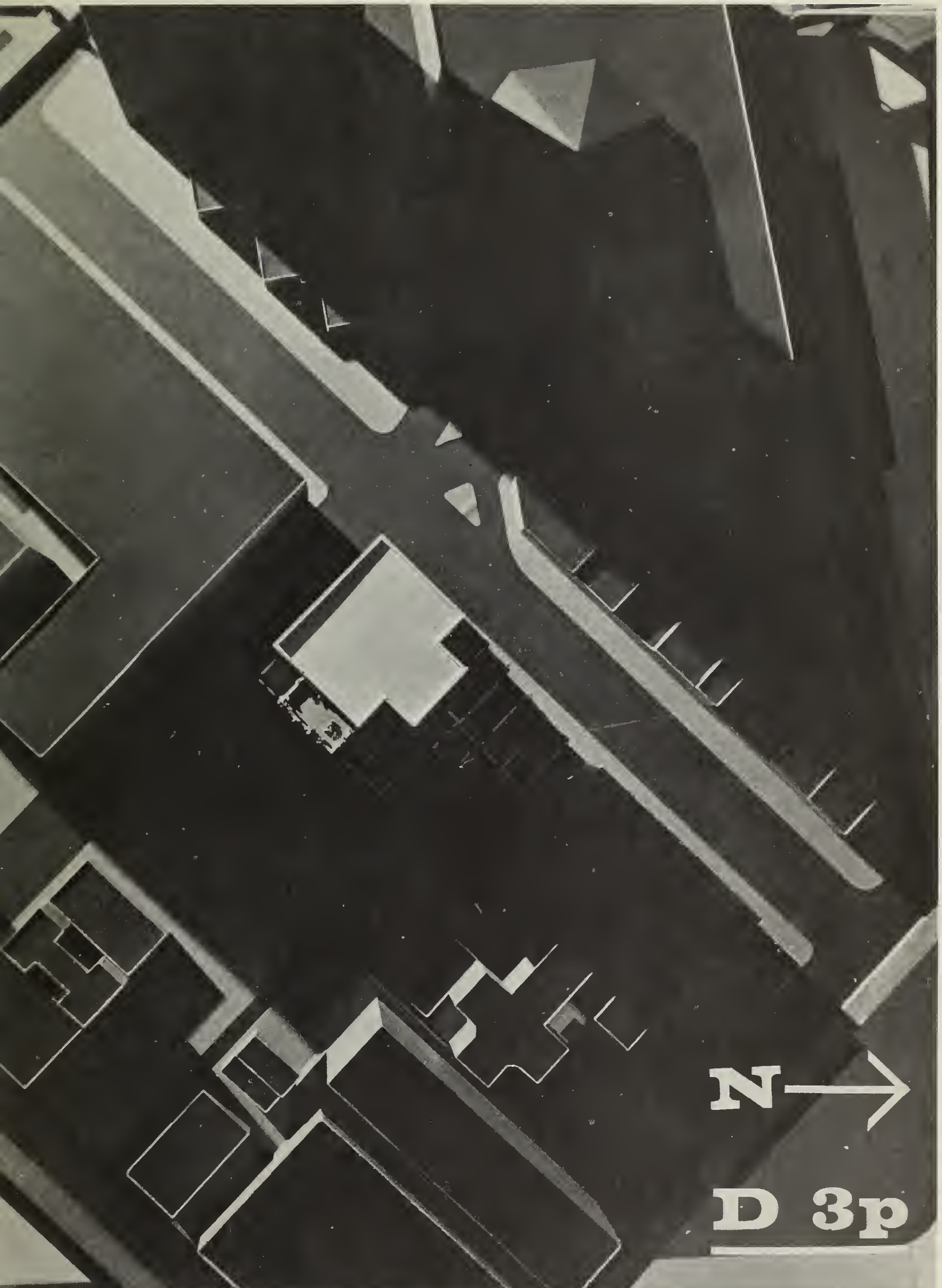
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APPENDIX E

EE 74.71

LOAD DISTRIBUTION CURVES

for

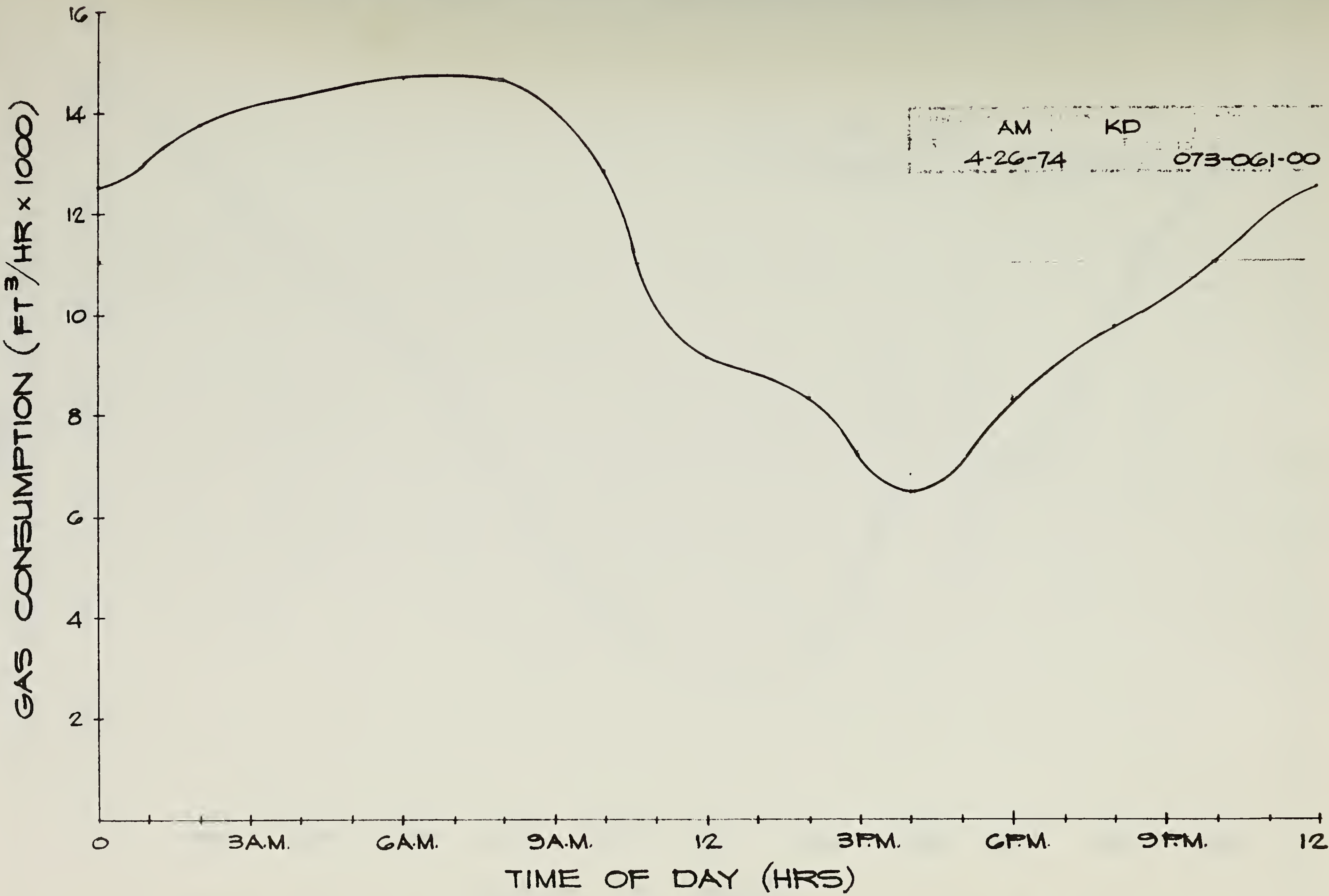
NATURAL GAS

BENTLEY ENGINEERS
149 New Montgomery Street
San Francisco, California 94105

April 26, 1974

SCIF OFFICE BUILDING

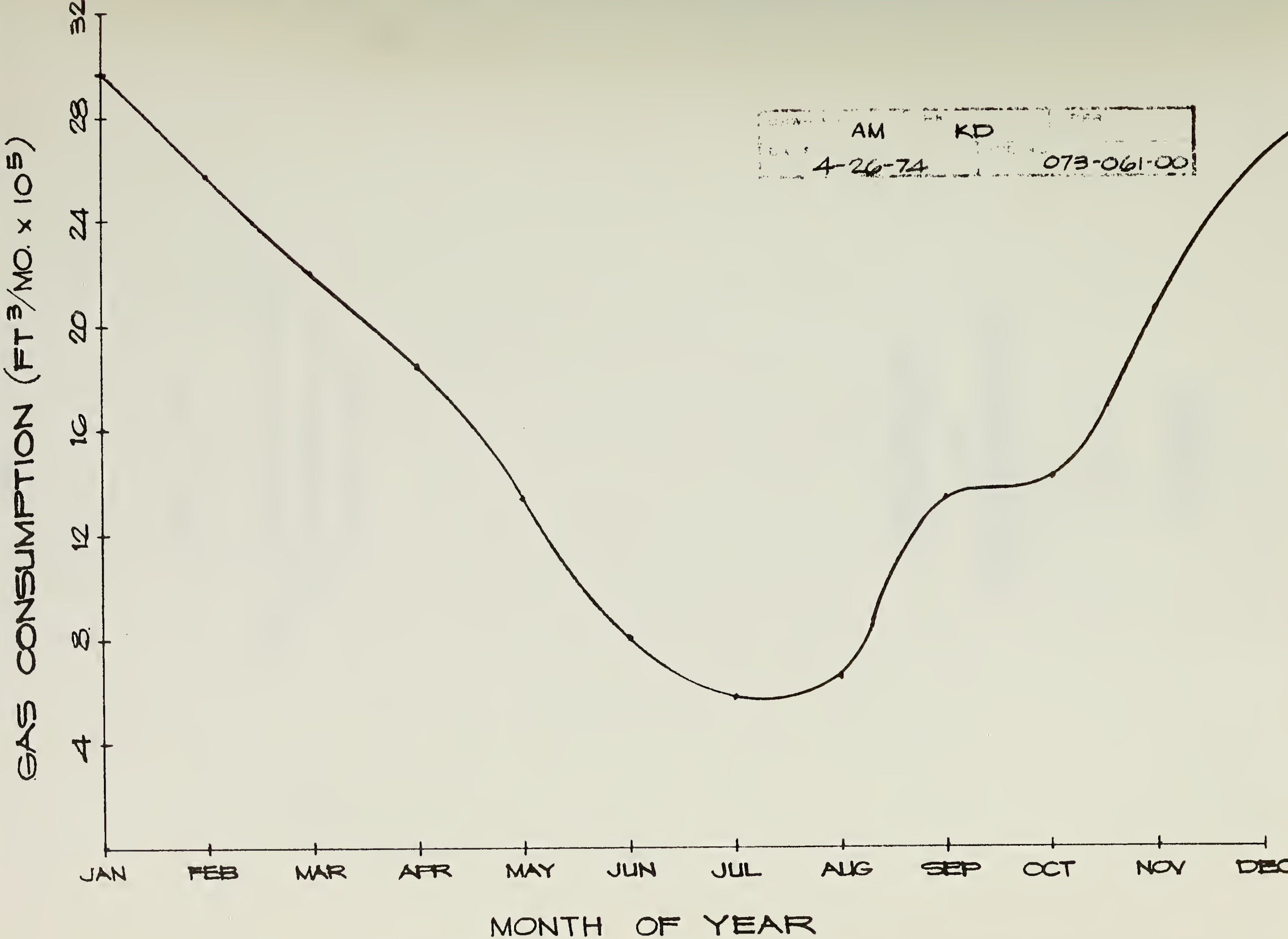
SHEET NO. 3



DAILY NATURAL GAS LOAD DISTRIBUTION CURVE
(FOR PEAK WINTER DESIGN DAY)

SCIF OFFICE BUILDING

SHEET NO. 4



ANNUAL NATURAL GAS LOAD DISTRIBUTION CURVE

APPENDIX F

EE 74.71

LOAD DISTRIBUTION CURVES

for

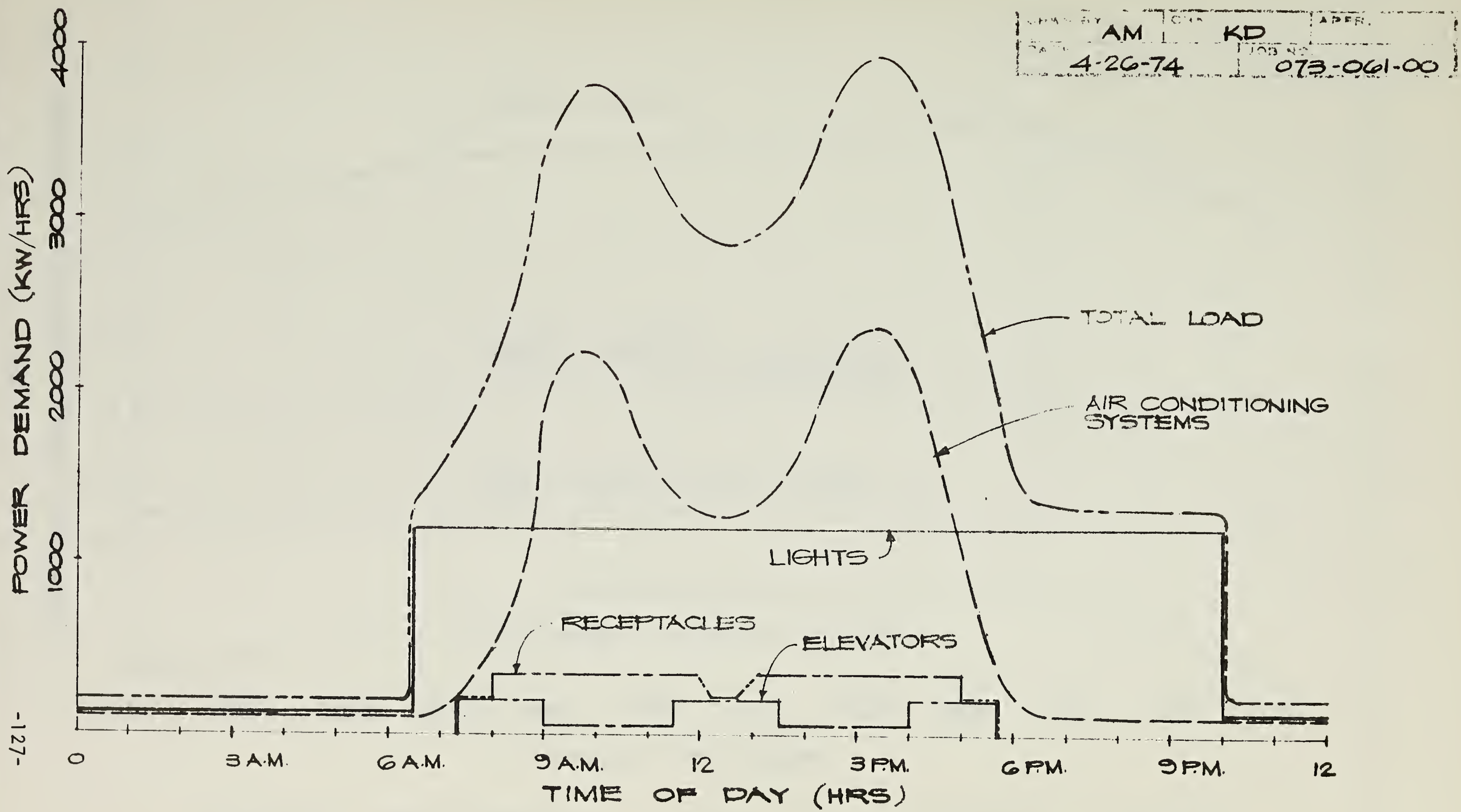
ELECTRICAL ENERGY

BENTLEY ENGINEERS
149 New Montgomery Street
San Francisco, California 94105

April 26, 1974

SCIF OFFICE BUILDING

SHEET NO. 1



DAILY ELECTRICAL LOAD DEMAND CURVE
(FOR PEAK SUMMER DESIGN DAY)

SCIF OFFICE BUILDING

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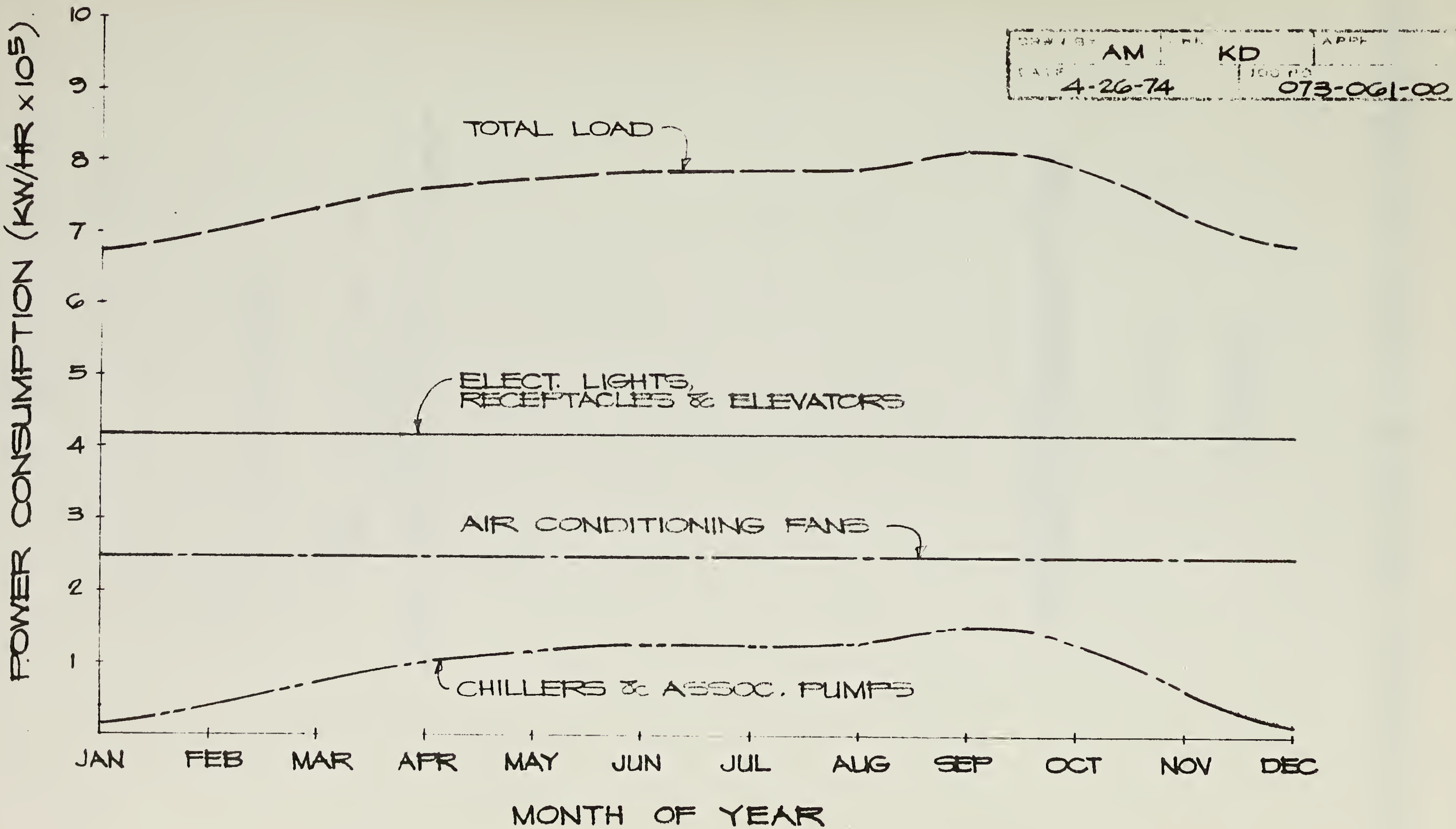

ANNUAL ELECTRICAL LOAD CONSUMPTION CURVE

APPENDIX G

EE 74.71

REPORT OF ARCHAEOLOGICAL RECONNAISSANCE

ARCHAEOLOGICAL CONSULTING AND RESEARCH SERVICES
20 Evergreen Avenue
Mill Valley, California 94941

September 24, 1974

PROJECT LOCATION

The proposed project location lies within the City and County of San Francisco, California. The property, which is essentially rectangular in shape, is bounded on the north by Market Street (275' frontage), on the west by Ninth Street (200' frontage), on the east by a 12 story masonry PSA Hotel, and on the south by a 3 story building and a parking lot. Cartographic location can be determined from the San Francisco North 7.5' USGS topographic quadrangle.

The proposed project area is currently in use as an asphalted parking lot. The now level surface of the property was created by the demolition of a three story building with a single basement.

PROPOSED PROJECT DESCRIPTION

Proposed for the project location is a 17 story high rise office building which will measure 240 feet X 150 feet at its base. The building will have a maximum of 3 basements, requiring excavations of up to 40 feet below the present curb elevation (Warnecke & Associates, 1974; Lee and Prasker, 1974).

INVESTIGATION METHOD

Prior to the actual field reconnaissance, maps and records on file at the Society for California Archaeology Clearinghouse #4 at San Francisco State University were examined for information regarding previously recorded archaeological site locations or field re-

connaissances for the proposed project area. Although these records indicated no known archaeological resources or prior reconnaissances within the specific boundaries of the proposed project, an archaeological discovery of major importance had been made in the property's immediate vicinity.

In October of 1969, during the excavations for the Civic Center Station of the BART system, human remains were encountered approximately 75 feet below Market Street's present surface. Archaeologists from the Adan E. Treganza Anthropology Museum at S. F. State College were called and they were able to remove a partial skeleton from a Bay-mud matrix. Physical anthropological examinations, floral analyses, geological studies and a carbon-14 age determination produced surprising results. The skeletal remains were that of a male with a height of approximately 5 feet 5 inches and an age of 24 to 26 years. Samples of the Bay-mud matrix revealed remains of horse-tail rush, seeds of various types of grasses, leaf fragments of oaks and willows, decomposed wood, and the exoskeletal portions of beetles. Geological studies determined that the body had been overlain by 55 feet of Bay-mud and had not sunk through materials to its discovered position. In short, it was concluded that a young male had died and was deposited or fell into the burial location, the area was a fresh water marsh, slough, or creek, and that after the deposition of the body, it was covered by Bay-mud. The major importance of the discovery was not realized, however, until 8 months later when the results of the carbon-14 age determination were made available. The carbon-14 tests revealed an age of 4900 plus or minus 250 years before present or

2930 B.C. (Henn and Schenk, 1970). This made the skeletal remains one of the oldest indications of human habitation in the entire Bay Area.

Maps and records contained within the California Historical Society Library were also examined to determine of the proposed project might encounter significant historic remains.

An archaeological reconnaissance of the proposed project's location was conducted by Mr. Stephen A. Dietz of Archaeological Consulting and Research Services.

INVESTIGATION RESULTS

Because of the existing asphalted parking lot which overlays the proposed project location, the entire ground surface of the property is obscured and a visual examination could not be made. It would appear, however, that an examination of soils immediately under the parking lot would not be useful in determining if aboriginal remains exist within the proposed project's boundaries. Historic maps and records indicate that the property in question had any standing buildings virtually leveled during the 1906 earthquake and fire. In addition, all structures within the property had been demolished and leveled for the construction of the existing parking lot. Thus, as a recent soils report concludes, there is man-made fill varying in depth from 9 to 20 feet directly under the parking lot (Lee and Prasker, 1974). The fill is said to be loose and characterized by bricks and concrete fragments as would have been used to backfill

old basements.

CONCLUSIONS AND RECOMMENDATIONS

Because of the nature of the historic remains which underlay the existing parking lot facilities, it would appear that no significant historic remains other than rubble from the 1906 earthquake and fire or the recent demolition activites will be encountered.

This does not, however, preclude the possibility of there being subsurface aboriginal remains within the boundaries of the proposed project activities. Because of the discovery of archaeological materials in the immediate vicinity of the proposed project, it must be recommended that a qualified professional archaeologist be retained to be present during excavation of materials located below the historic fill. If during the course of project related activities any buried or otherwise obscured archaeological resources are encountered, all activities should be halted within a 30 meter radius of the find and the archaeologist would ascertain the nature of the discovery, assess the situation, and recommend mitigation as is necessary.

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